



VOLUME 1: GENERAL INFORMATION

1.5.4 SITE INVESTIGATIONS



Former Kent Street Baths, Birmingham Phase 2 Site Investigation

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Rev	Description	Issued by	Checked	Date
V02	Updated Gas Risk Assessment	ST	RA	04/07/2017
V03	Changes to sections 1.1, 1.2, 2.2, 2.3.4, 6.1.1 and updated development plan in Appendix A1.	RS	RA	18/10/2017
V04	Addition of trial trenches and findings to section 5.9 and logs included within Appendix A2.	RS	RA	26/01/2018
V05	Update client and revision number.	RS	RA	10/01/2019

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Executive Summary

Appointment	In May 2017 Curtins were instructed to undertake a Phase 2 Intrusive Investigation at the site located off Kent Street in Birmingham. The site is centred on NGR 4070110, 285990, and covers an area of approximately 0.91 Ha. This investigation addresses recommendations as presented in the Phase 1 report (ref. 18), with the aim of the Phase 2 works to characterise geo-environmental conditions prior to redevelopment for a new PRS scheme for 504 residential developments (406 PRS and 98 open market) with lower car parking.
Current Site Status	The site is largely surfaced by reclaimed rubble hardcore, tarmac and concrete. The site is bound to the north by Bromsgrove Street and a residential construction site with commercial buildings beyond, to the east by Gooch Street with bars, nightclubs beyond, to the south by Wrentham Street and residential construction site with industrial buildings beyond and to the west by Henstead Street with refurbished residential housing.
	Initially the site was occupied by corporation baths in the central area of the site. From 1905 to 1937 Henstead Street is developed with public bath expanding to occupy the eastern boundary. From 1937 to 1978 residential and works to the sites north-west have been demolished with the construction of some additional works in the north.
	An oil tank and building with asbestos roofing is noted. The baths were used as an air raid shelter during the 1940's with the site suffering a direct hit. Two ruins are recorded on the western half of the public baths.
Summary of Phase 1	From 1979 buildings, have be demolished on site by 2009 forming the present-day car park with two structures remaining. A small electric substation structure remaining at the eastern corner. And larger abandoned warehouse to the north-western corner. The site has remained relatively unchanged to the present day.
	Primary potential risks to be investigated during the Phase 2, as well as establishing ground conditions for geotechnical design, included; potential for land gas, risks to human health and controlled waters.
Fieldworks Undertaken	Fieldworks were carried out from 15 th - 24 th May 2017 and comprised, thirteen window sample boreholes to maximum 5 m depth, eight machine excavated trial pits and six rotary cored boreholes. Additional trial trenches were undertaken on the 3 rd and 4 th January 2018. Land gas and groundwater monitoring standpipes/piezometers were installed in selected boreholes. Selected groundwater and soil samples were subjected to laboratory analysis and six return land gas monitoring visits were undertaken.
Encountered Ground Conditions	The ground conditions at the site generally comprised Made Ground to an average depth of 1.89mbgl, over SAND and GRAVEL residual soils to an average depth of 9.30mbgl, underlain by Bromsgrove SANDSTONE to an unconfirmed depth of 22.66mbgl. Groundwater is relatively shallow recorded between 3.65 - 4.20mbgl to date.
Environmental Laboratory Testing and Land Gas	The environmental chemistry soil results have been compared with the Tier 1 criteria for soils with respect to human health against 'Residential without home grown produce' thresholds. With respect to the proposed end use of the site Tier 1 thresholds have been exceeded in made ground samples on a site wide basis, particularly PAHs, Lead and to a lesser extent Mercury, Cyanide and Asbestos.
Monitoring Results	During land gas monitoring, a maximum concentration of 10.6% v/v carbon dioxide (CO2) was recorded in RC01. No positive flow has been recorded during the monitoring period. Concentrations of methane (CH4) have been recorded below the instruments limit of detection. This maximum

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	recorded level of CO2 results in a calculated Gas Screening Value (GSV) of 0.0085, if maximum flow is taken as 0.1 l/hr.
Ground Contamination and Ground Gas Assessment	Risks to human health and construction & maintenance works have been assessed as moderate. With reference to Situation A non-traditional construction as defined by the NHBC and the modified Wilson & Card classification as contained within CIRIA C665, the maximum methane and carbon dioxide concentrations and respective gas screening values indicate a Gas Characterisation Situation 2 (CS2) gas regime, requiring gas protection measures for the proposed new development.
Preliminary Material Classification and Soils Reuse	If soil arisings are required to be disposed off-site, an initial assessment of shallow soils was carried out using a proprietary waste characterisation assessment tool. The initial assessment revealed that of the fourteen made ground soils tested, four samples have indicated to be hazardous waste for off-site disposal purposes with respect to Environment Agency waste classes, using the guidance given in WM3. The remaining ten soil samples are classed as non-hazardous waste for off-site disposal purposes. Of the eighteen samples, four were of the natural strata. This is recorded to be non-hazardous waste with regards to off-site disposal purposes. The Contractors should satisfy themselves regarding the classification of any waste arisings. Confirmation of acceptability should be sought from the receiving landfill or treatment facility via the issue of laboratory chemical testing results. Excavated soils should be suitable for reuse at the site following appropriate waste management regulations and/or under a Materials Management Plan (MMP).
Geotechnical Assessment	Based on observations made on site, together with results of in-situ and laboratory tests, it is anticipated that a piled foundation solution may be adopted transferring the high structural loads to the sandstone bedrock. Due to the depth of made ground encountered suspended floor slabs should be considered for the proposed structures. A Design Sulphate Class for concrete of DS-1 may be assigned, with site conditions would suggesting that an ACEC class for the site of AC-1 would be appropriate.
Ground Contamination Recommendations	Overall, the site is deemed suitable for the proposed development, subject to the following mitigation measures being implemented. 600mm of clean and inert topsoil underlain by a hi-visibility geotextile membrane should be provided to any soft landscaping areas. CS2 grade gas protection measures should be provided to all developments. A Remediation Strategy and Verification Report will be required to detail and approve the above measures.

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Phase 2 Site Investigation

1.0 Introduction

1.1 Project Background

In May 2017 Curtins were instructed to undertake a Phase 2 Intrusive Investigation at the Kent St site in Birmingham. The site is centred on NGR 407010, 285990, and covers an area of approximately 0.91 Ha. A site location plan is presented in *Figure 2.1*.

1.2 Scope of Services

This investigation addresses recommendations as presented in the Curtins Phase 1 report (ref.18), with the aim of the Phase 2 works to characterise geo-environmental conditions prior to redevelopment comprising a new PRS scheme for 504 residential developments (406 PRS and 98 open market) with lower ground car parking. The current development plans for which can be referred to within *Appendix A1* of this report.

Specifically, the Phase 2 report is intended to determine:

- a) If there is a risk of the proposed end user being adversely impacted upon by potential contamination in shallow site soils that may be present on the site due to its known current, recent and historical use;
- b) If there is a risk of groundwater and/or surface water being adversely impacted upon by potential contamination that may be present on the site due to its known current, recent and historical use;
- c) If there is a risk to the end user from soil gases including methane, carbon dioxide, oxygen and hydrogen sulphide;
- d) Recommendations for the design of foundations and building ground floor slabs; and
- e) Recommendations for the specification of sub-structure concrete and water supply pipes.

Consideration of detailed flood risk, ecology and archaeological issues are outside of the scope of this report.



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2.0 Phase 1 Preliminary Site Assessment Summary

This section presents a summary of the current site setting, history, geology and hydrogeology/hydrology, as presented in the Curtins Phase 1 report (ref. 18). It is not the intention of this report to duplicate the Phase 1, with the information below providing the background information to support the revised post Phase 2 siteworks Conceptual Site Model (CSM), as presented in Section 8.

2.1 Current Setting

The site is located off Kent Street as illustrated in Figure 2.1 below. The site is currently used as a car park with three sections divided by palisade fencing. An old substation is located to the middle of the sites Eastern edge.

The site is largely surfaced by reclaimed rubble hardcore, tarmac and concrete. The site is bounded to the north by Bromsgrove Street and a residential constructions site with commercial buildings beyond, to the east by Gooch Street with bars, nightclubs beyond, to the south by Wrentham Street and a residential construction site with industrial buildings beyond and to the west by Henstead Street with refurbished residential housing.



Fig 2.1 – Site Location Plan, site boundary shown in pink, 250m buffer shown as the purple circle Crown Copyright. License Number 100022432.

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2.2 **Previous Site Use**

A review of the available historical mapping information for the site (as presented within Curtins Phase 1 report) (ref. 18) has been undertaken with specific reference to potential sources of contamination.

The earliest available historical mapping (1889) show the site to be occupied by the corporation baths over the centrals site with surrounding areas covered by works and residential buildings. The area surrounding the site is occupied by residential buildings with sporadic works buildings amongst these. Works recorded include a brass foundry, saw mill and iron and tin works. From 1905 to 1937 Henstead Street is developed with the public bath expanding to the occupy the eastern boundary.

From 1937 to 1978 residential and works to the sites north-west have been demolished with the construction of some additional works in the north. An oil tank and building with asbestos roofing is noted. The baths were used as an air raid shelter during the 1940's with the site suffering a direct hit. Two ruins are recorded on the western half of the public baths. Some surrounding residential buildings have been demolished an engineering works is located 10m west of site. Several ruins are recorded within 250m of the site.

From 1979 buildings, have been demolished on site by 2009 forming the present-day car park with two structures remaining. A small electric substation structure remaining at the eastern corner. And larger abandoned warehouse to the north-western corner. The site has remained relatively unchanged to the present day.

2.3 Published Geology

A study of the Envirocheck, BGS borehole records and BGS 1: 50,000 mapping (Solid and Superficial Editions) for Birmingham (Sheet 168) indicates the following geological succession underlying the site:

- Made ground
- Bromsgrove Sandstone Formation

2.3.1 Made Ground Deposits

Made ground deposits are indicated to be present on the site and are expected to be substantial based historical site development.

2.3.2 Bedrock Deposits

Bedrock deposits are expected to be present as the Bromsgrove Sandstone Formation. This consists of Early Triassic red brown and grey SANDSTONE with interbedded red brown siltstone and mudstone. These are commonly pebbly or even conglomeritic at the base of beds.



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2.3.3 Mining and Quarrying

The Envirocheck Report and The Coal Authority's online interactive mapping confirms that the site is not within a coal mining referral area.

There are no BGS recorded mineral site within 250m of the site boundary.

2.3.4 Other Pertinent Geological Existing Geological Records

The Envirocheck Report confirms that there is no hazard to very low risk from the following ground stability hazards on and around the site; running sands, collapsible ground, landslides, shrinking or swelling clay, compressible ground and ground dissolution.

The BGS Radon Mapping confirms the site is situated in a lower probability radon area where <1% of homes are above the radon action level. On this basis radon protection measures are not considered necessary in the construction of new dwellings or extensions.

Where the new development incorporates a basement the advice of a specialist Radon assessor must be obtained.

A single fault is located 30-40m south east of the site trending roughly north-east to south-west with the downthrow to the south-east.

2.4 Hydrogeology and Hydrology

Environment Agency data indicates that the site, has a Principle Aquifer with regards to the Bromsgrove Sandstone Formation bedrock. A Principle Aquifers are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer. The site is not situated within a Source Protection Zone (SPZ). There are no groundwater abstractions within 250m of the site. The closest surface water receptor is the River Rea located approximately 500m to the east. There are no surface water abstractions recorded within 250m of the site. The closest is recorded 72m north-east of the site for Pure Island relating to dry cleaning. There is one pollution incident to controlled waters 231m south-east of the site. The pollutant was crude sewage entering the River Rea catchment in 1961 as a minor incident. The site does not lie within an area depicted on the EA Flood Zone maps to be at risk of flooding from rivers of the sea. The site has no attributed risk for surface water flooding. It should be noted that the roads surrounding site are at low risk from water flooding.

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2.5 Landfill

There are no currently operational or historic landfills recorded within 250m of the site. There are no registered waste treatment or disposal sites recorded within 250m of the site. There are seven local authority pollution and prevention control permits within 250m of the site. The closest is 72m north-east of the site for Pure Island relating to dry cleaning.

2.6 Unexploded Ordnance (UXO) Risk Assessment

Risk mapping for UXO's has placed the site in a high-risk area. High risk areas are those that show a density of bombing hits of 50+ bombs per 1000 acres and contains potential WWII targets. Further action is considered essential to mitigate UXO risk in high risk areas.

The Envirocheck Report historical mapping indicates several ruins within 250m, two ruins on site, a recorded direct hit and several buildings that disappeared during WWII.

The site before the WWII bombing was in an urban area which was likely to have been targeted during WWII. The site has undergone limited of re-development, and extensive demolition increasing the likelihood of encountering potential UXO devices at the time.

Based on the forgoing commentary, the likelihood of encountering UXO on site as part of the ground investigation or development works is high.

If unexploded ordnance is discovered, stop immediately, prevent access to the area, and inform the police. If the site boundary or location changes then the UXO risk should be reassessed.

2.7 Previous Reports

No previous reports have been made available for review by the client.

2.8 Summary of Phase 1 PCSM

The potential sources of contamination at the site and the implications with respect to development have been interpreted in accordance with the current government guidance on source-pathway-receptor risk assessment.

2.5.1 Potential Source

On site sources of potential contamination: The following specific potential sources are identified which may serve to increase the potential for contamination to be present on site;

 Isolated asbestos in made ground from demolition of previous buildings due to the previous construction materials used during the 19th and 20th Century.



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- Leaks or spills from the former tank on the east of the site.
- Leaks or spills from former industrial processes (cigar, tin and leather works).
- Uncontrolled deposition of made ground from the demolition of previous buildings.
- Dielectric filler fluids associated with the electricity sub-station on the eastern boundary.

Potential contaminants of concern associated with the above sources include, amongst others; hydrocarbons including diesel/petrol range organics from fuel spillages, polycyclic aromatic hydrocarbons arising from incomplete combustion, and inorganic compounds including metals, non-metals (from chemical spillages) and asbestos.

Off-site sources of potential contamination: Historical and present uses of the surrounding area may provide contamination sources including;

- Uncontrolled deposition of Made Ground resulting from several re-development stages in the surrounding area.
- Localised spillages and leakages associated with the surrounding works over the years (Brass foundry, saw mills, iron and tin works and engineering works).

Potential contaminants of concern associated with the above sources include, amongst others; hydrocarbons including diesel/petrol range organics from fuel spillages, polycyclic aromatic hydrocarbons arising from incomplete combustion, and inorganic compounds including metals, non-metals and asbestos.

On and Off-site soils with the potential to generate ground gases.

• Suspected Made Ground deposits expected to be encountered onsite.

Unexploded Ordnance.

 During WWII, the site was in an area of high bombing density as such the site is designated as high risk from UXO.

2.5.2 Potential Pathways

Direct contact, ingestion and inhalation (dust and vapours) may occur where end user is exposed to; solid, dust or volatile components of Made Ground soils.

Vertical migration may occur within the possible Made Ground deposits on site upwards, due to processes including; capillary action, burrowing animals inducing soil mixing and downwards into the natural deposits due to processes including; infiltration. Vertical migration of soil gases is identified as a specific pathway.

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Horizontal Migration may occur within made ground or natural deposits due to processes including; the influence of perched or natural groundwater flow patterns and natural or manmade high permeability zones, e.g. sand lenses or drainage runs or pores/voids within natural and made ground soils for ground gases.

2.5.3 Potential Receptors

End users

• Residents and public.

Controlled Waters (Groundwater)

- Corresponding with the underlying solid geology, the site is underlain by a Principal Aquifer within the bedrock with no recorded superficial deposits.
- The site is not within a designated Source Protection Zone (SPZ).
- There are no potable groundwater abstractions within 250m of the site.

Construction Workers

Whilst unlikely, during the development of the site, construction workers may encounter any contamination that is on site. However, wearing the correct personal protective equipment will reduce the risk.

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3.0 Phase 2 Investigation Scope of Works

Site investigation works were undertaken between the 15th and 24th May 2017. Additional trial trenches were completed on the 3rd and 4th January 2018.

The scope of the ground investigation was designed in general accordance with current UK guidance including CLR11 (Ref.1), British Standard (BS) 10175 (Ref.2), BS5930:2010 (Ref.3) and Eurocode 7 (Ref.4). A summary of the scope and rationale are summarised in Table 3.0 below.



Exploratory Hole Type	Exploratory Hole Reference	Exploratory Hole Depth (m bgl)	Rationale
Trial Pits	TP01 – TP08	Max depth 3.50l	Confirm shallow ground conditions Collect soil and water samples for chemical and geotechnical analysis (Targeting the historical tank in the east of the site) Determine geotechnical parameters
Window Sample Boreholes	WS06 – WS13	Max depth 5.00	Confirm ground conditions Collect soil and water samples for chemical and geotechnical analysis. Undertake in-situ testing Gas and groundwater monitoring Determine geotechnical parameters
Window Sample Boreholes	WS01 – WS05	Max depth 4.00l	Confirm ground conditions. Collect soil and water samples for chemical and geotechnical analysis. Undertake in-situ testing Allow UXO clearance for rotary follow on. Determine geotechnical parameters
Rotary Core Boreholes	RC01 – RC06	Max depth 20.00	Confirm bedrock depth and conditions. Collect rock samples for analysis. Gas and groundwater monitoring Determine geotechnical parameters
Trial Trenches	TT01 – TT06	Max depth 4.10	Identify extent and type of foundations / floor slabs present around the south-eastern and north-eastern boundary.

Curtins drawing ref. 063793-CUR-00-XX-DR-GE-00001-V04_Exploratory Hole Location Plan records the locations of the exploratory holes, a copy of which is contained within *Appendix A1*.

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3.1 Soil Logging and Sampling

Machine excavated trial pits and exploratory window sample hole arisings, were logged on site by a qualified Engineer. All exploratory holes were logged in accordance with the requirements of BS5930 (Ref.3), including recording observed visual and olfactory indications of contamination. Exploratory hole logs are provided in *Appendix A2*.

3.2 Monitoring Well Installations

Ground gas and groundwater monitoring installations (50 mm diameter) were installed within 4 window sample boreholes and 5 rotary core boreholes. A bentonite seal was placed above and below the screened section of the borehole to minimise potential for downward migration of contaminants and the creation of a preferential migratory pathway. A gravel surround was installed in the annulus between the sides of the borehole and the slotted sections of pipe.

The 50 mm diameter monitoring wells were primarily designed to assess the potential for ground gas and strata likely to have the highest permeability and as such the screened section focussed on made ground where sufficient depth was encountered or the underlying natural strata. A summary of the response zones is presented in Table 3.2 below.

Borehole Reference Response Zone(s) (m bgl)		Strata Description(s) (Principal strata in capitals)
WS08	2.50 – 3.60	SAND
WS11	1.00 – 2.00	MADE GROUND (Sand and Clay)
WS12	2.00 - 4.00	SAND
WS13	2.00 – 3.85	SAND
RC01	2.50 – 10.0	SAND and GRAVEL
RC02	4.50 - 8.00	SAND and GRAVEL / SAND / SANDSTONE
RC03	4.50 – 9.00	SAND and GRAVEL / SANDSTONE
RC04	2.50 – 12.00	SAND and GRAVEL / SANDSTONE
RC05	2.50 – 12.00	CLAY

Table 3.2 - Monitoring Well Response Zones



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Copies of borehole logs can be referred to in *Appendix A2* of this report.

3.3 Post-Investigation Monitoring

3.3.1 Ground Gas Monitoring

An initial programme of six gas monitoring visits over three months was proposed to assess ground gas conditions as identified in the Preliminary Conceptual Site Model in the Phase 1 Preliminary Site Assessment (Ref. 18).

The ground gas monitoring schedule has now been completed.

3.3.2 Groundwater Sampling

Groundwater samples were obtained from rotary boreholes RC01 to RC05 collected during the second monitoring visit.

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4.0 Laboratory Analysis

Representative soil samples were selected for laboratory chemical analysis, based on field observations and to provide a characterisation of the made ground and natural strata encountered. Selected soil samples were placed in laboratory provided containers and stored in cool boxes prior to being transported to the nominated laboratory under the laboratory's chain of custody documentation. The laboratory selected by Curtins for chemical analysis was Concept Life Sciences Laboratories (CSL), a UKAS and MCERTS accredited laboratory. The laboratory selected by Curtins for geotechnical analysis was Professional Soils Laboratories (PSL), a UKAS accredited laboratory.

Given the potential site wide source of contamination (made ground) the sampling positions (boreholes) were generally located in a non-targeted, systematic array to give adequate and representative coverage of the site accounting for the historical site use, proposed end use and the immediate environmental setting.

4.1 Soil Analysis

The contaminants of concern potentially present on the site was considered to include, amongst others; organic matter, ash and fill, hydrocarbons (e.g. fuel/oils), heavy metals and asbestos the extent of which is captured by the broad environmental testing suite listed in Table 4.1 below.

Suite Ref.	Analyte	LOD
	Asbestos Screen, pH and Soil Organic Matter (SOM)	-
	Arsenic, Chromium, Chromium VI, Copper, Lead, Selenium, Zinc, Nickel	5 mg/kg
	Boron (water soluble)	1 mg/kg
	Cadmium	0.5 mg/kg
	Mercury	0.1 mg/kg
Soils Suite A	Cyanide (total)	10 mg/kg
	Sulphate (total)	200 mg/kg
	Sulphide	2 mg/kg
	Sulphur (elemental)	20 mg/kg
	Phenols (screen)	1 mg/kg
	PAHs (USEPA 16)	0.1 mg/kg
	TPH (Aro/Ali Split)	0.01 to 0.1 mg/kg

Table 4.1 - Environmental Chemistry Analysis Suite : Soils

Soil samples were taken from within made ground and natural soils from each exploratory hole location. 19 soil samples have been scheduled and tested for Suite A.

Copies of the environmental chemistry testing certificates are presented in Appendix A3.



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4.2 Groundwater Analysis

The contaminants of concern potentially present on the site was considered to include, amongst others; organic matter, ash and fill, hydrocarbons (e.g. fuel/oils) and heavy metals the extent of which is captured by the broad environmental testing suite listed in Table 4.2 below.

Table 4.2 - Environmental Chemistry Analysis Suite : Waters	

Suite Ref.	Analyte	LOD
	рН	-
	Total Hardness	1 mg/l
	Arsenic, Lead, Nickel, Selenium, Zinc	1 μg/l
Water Suite A	Boron (water soluble), Chromium, Copper, Mercury, Phenols (screen)	0.1 μg/l
	Cadmium	0.5 μg/l
	Cyanide, Sulphide	0.2 mg/l
	Sulphate,	10 mg/l
	PAHs (USEPA16)	0.01 µg/l
	TPH (Aro/Ali Split)	10 µg/l

Five water samples were taken from rotary boreholes RC01 to RC05 and tested for the above suite.

Copies of the environmental chemistry testing certificates are presented in Appendix A3.

4.3 QA/QC

No deviations, duplicates, blanks or untestable samples were encountered.

4.4 Geotechnical Analysis

Soil samples for testing were prepared in accordance with BS1377: Part One: 1990 and representative sub-samples were taken for testing. The following tests were carried out:

- 16 No. Moisture content
- 16 No. Water soluble sulphate
- 16 No pH value
- 4 No. Particle Size Density (>63um)
- 4 No. Particle Size Density (<63um)
- 20 No. Point Load Tests
- 4 No. UCS tests

Copies of the geotechnical testing certificates are presented in Appendix A4.



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5.0 Encountered Ground Conditions

5.1 General

A summary of the ground conditions encountered during the site investigation works is presented below, with detailed information presented in the exploratory hole logs included in Appendix A2 and a summary of each strata presented in subsequent sections.

Stratum	Depth to top of	Thickness (m)		Description
	m bgl	Min	Max	
MADE GROUND	0.00	0.37	4.50	MADE GROUND predominately brick and concrete cobbley gravelly sand.
RESIDUAL SOILS (SANDS & GRAVELS)	2.10	1.60	9.20	SAND and GRAVEL
BEDROCK (Bromsgrove Sandstone Formation)	6.90	7.10*	17.20*	Reddish brown SANDSTONE

Table 5.1 – Summary of Ground Conditions Encountered

* - Thickness not proved

5.2 Made Ground

Made ground was encountered in all exploratory holes from ground level, to a maximum depth of 4.50mbgl. Deposits were typically encountered as the exposed surface of the car park at ground level. The composition tended to be gravelly fine to coarse SAND with frequent angular to sub angular cobbles. Constituents within the made ground were recorded as concrete, brick, ceramics, glass, metal, plastic, tarmac, tiles and wood. SPT 'N' values recorded in the Made Ground Deposits ranged between 0 and 50+ (Refusal).

Table 5.2 – Summary of geotechnical test results – Made Ground Deposits

Parameter	No. of tests	Minimum	Maximum	Average
Moisture Content (%)	6	12	18	15.3
рН	6	8.3	10.9	9.05
Water Soluble Sulphate (g/l)	6	<0.1	0.7	<0.1
PSD (%)	2	0	0	0

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Parameter	No. of tests	Minimum	Maximum	Average
Cobbles		33	47	40
Gravel		38	60	49
Sand		13	13	13
Silt/Clay		2	2	2
SPT 'N' Value	18	0	50+ (R47efusal)	19

5.3 Residual Soils

Geological mapping records the absence of superficial deposits at the site, therefore it is considered residual soils comprising of completely weathered bedrock were encountered within RC01 to RC05, TP01, WS01, WS03, WS08, WS12, WS13B to a maximum depth of 11.6mbgl. Deposits were typically encountered as red brown variably gravelly SAND with occasional bands of sand gravelly CLAY. Sand is fine to coarse, gravel is subangular to subrounded of quartz and sandstone. SPT 'N' values recorded in the superficial deposits ranged between 15 and 50+ (Refusal).

Parameter	No. of tests	Minimum	Maximum	Average
Moisture Content (%)	10	7.6	20	13.9
рН	10	7.2	9.1	7.74
Water Soluble Sulphate (g/l)	10	<0.1	<0.1	<0.1
PSD (%)		0	0	0
Cobbles		7	16	11.5
Gravel	2	69	77	73
Sand		14	14	14
Silt/Clay		1	2	1.5
SPT 'N' Value	9	15	50+	32.2

Table 5.3 – Summary of geotechnical test results – Residual Soils

5.4 Bedrock Deposits

Bedrock deposits generally comprise a very weak red brown Fine to coarse grained SANDSTONE with variability in strength and cementation. Some of the sandstone is recorded as a sand due to drilling process disintegration. With rare bands of red brown CLAY. SPT 'N' values recorded are all 50 + (Refusal) results. Four Uniaxial Compressive Strength Tests (UCS) were carried out on samples of sandstone.



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UCS values in the range 8.0 to 17.4 MPa were obtained. These values indicate weak materials.

A total of twenty Point load tests (PLT) carried out on rock core samples recorded values of Is50 MN/m² in the range 0.02 to 0.29 MPa indicating extremely weak material.

Parameter	No. of tests	Minimum	Maximum	Average
SPT 'N' Value	5	50+	50+	50+
Point Load Tests (Is50 MPa)	20	0.02	0.29	0.14
UCS MPa (Is50 * factor)	4	8.0	17.4	12.1

5.5 Observed Potential Contamination

Soils which exhibited potential contamination were noted during the investigation works and detailed in Table 5.5 as follows:

Location Number	Observed Contamination	Strata	Depth (mbgl)
TD01	Ash, brick and concrete	MADE GROUND (Sand and gravel)	0.00 - 0.20
IPUI	Brick and concrete	MADE GROUND (Gravel & Sand)	0.20 - 1.90
TP02	Brick, concrete and ceramic	MADE GROUND (Sand)	0.00 - 0.10
1602	Concrete, brick, metal and fabric.	MADE GROUND (Gravel)	0.10 - 1.80
TP03	Concrete, brick, glass, metal, clinker	MADE GROUND (Sand)	0.00 – 2.30
TP04	Concrete and brick	MADE GROUND (Sand)	0.00 - 3.50
TP05	Concrete	MADE GROUND (Sand)	0.00 - 0.37
	Concrete and brick	MADE GROUND (Gravel)	0.00 - 0.10
TP06	Concrete, brick, metal, rebar and plastic	MADE GROUND (Cobbles)	0.10 – 1.70
	Concrete, brick and ceramic	MADE GROUND (Gravel)	0.00 - 0.15
TP07	Concrete, brick, ceramic and metal	MADE GROUND (Sand)	0.15 – 1.20

Table 5.5 - Observed Potential Contamination

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Location Number	Observed Contamination	Strata	Depth (mbgl)
	Concrete and brick	MADE GROUND (Gravel)	0.00 - 0.10
TP08	Concrete, brick, fabric, plastic and metal	MADE GROUND (Clay)	0.10 - 2.00
WS01 /	Concrete, brick and asphalt	MADE GROUND (Sand)	0.00 – 0.75
RC01	Brick	MADE GROUND (Sand)	0.75 – 1.50
WS02 / RC02	Concrete and brick	MADE GROUND (Sand)	0.00 – 1.50
WS03 / RC03	Concrete and brick	MADE GROUND (Sand)	0.00 – 3.30
WS04 / RC04	Concrete, brick and rebar	MADE GROUND (Sand)	0.00 – 2.10
WS05 / RC05	Concrete and brick	MADE GROUND (Gravel)	0.00 - 1.40
WS07	Concrete and brick	MADE GROUND (Gravel)	0.00 - 1.50
W000	Concrete and brick	MADE GROUND (Sand)	0.00 - 1.40
VV 508	Concrete, brick, and rebar	MADE GROUND (Clay)	1.40 - 2.20
WS10	Concrete, brick and rebar	MADE GROUND (Gravel)	0.10 - 2.20
	Concrete	MADE GROUND (Gravel)	0.00 - 0.10
WS11	Concrete, brick, rebar, and wood	MADE GROUND (Sand)	0.10 - 0.80
	Brick	MADE GROUND (Clay)	0.80 - 2.00
WS12	Concrete and brick	MADE GROUND (Sand)	0.00 - 2.00
WS13B	Concrete and brick	MADE GROUND (Sand)	0.00 – 1.50

5.6 **Obstructions Encountered**

Several obstructions were encountered across the site during the investigation works which inhibited the advancement of machine excavated trial pits and window sample boreholes. These are detailed in Table 5.6 as follows:

Table 5.6 – Obstructions Encountered

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Location Number	Type of Obstruction	Strata	Depth (mbgl)
WS02	Sampler refusal possibly upon large cobbles, hole terminated	MADE GROUND	1.50
WS04	SPT refusal, hole terminated	MADE GROUND	2.00
WS05	SPT refusal, hole terminated	MADE GROUND	1.40
WS07	Sampler refusal, sampler damaged in process, collapse causing casing jam, collapse back to just below ground level, hole terminates	MADE GROUND	1.50
WS13A	Brick surface above void encountered, hole through brick repaired and hole backfilled, hole terminated and relocated 5m North	MADE GROUND	0.85
TP02	Large concrete boulder encountered at 1.2mbgl, JCB unable to move, digger arm obstructed at 1.8mbgl due to boulder presence, hole terminated	MADE GROUND	1.20 / 1.80
TP03	Flat concrete surface encountered, unable to break through with bucket, unsafe to use breaker due to potential unknown services, hole terminated	MADE GROUND	2.30
TP05	Flat concrete obstruction encountered, unsafe to break through due to identified local large concrete void (sewer / drain), C.A.T electrical signals strong throughout area, public vehicles parked in areas suitable to excavate, hole terminated	MADE GROUND	0.37
TP06	Pit collapsing at rate of excavation, hole terminated	MADE GROUND	1.70
TP07	Pit collapsing at rate of excavation, hole terminated	MADE GROUND	1.20
TP08	Pit collapsing at rate of excavation, hole terminated	MADE GROUND	2.00

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5.7 Groundwater

A summary of the groundwater levels recorded during the siteworks, and subsequent monitoring is presented in Table 5.7. Full details of the water strikes recorded during progression of the investigation positions are presented on the exploratory hole logs included in Appendix A2 and full details of the water levels recorded during the monitoring visits are presented in Appendix A5.

Exploratory	Water S	Strikes	Monitored Water Levels		
Hole Location Ref.	Strike Depth (mbgl)	Strata	Installation Strata	Monitored Levels (mbgl)	
RC01	2.20	MADE GROUND	SAND & GRAVEL	3.70 - 3.80	
RC02	6.60 12.4	SAND & GRAVEL SANDSTONE	SAND & GRAVEL / SAND	3.65 – 3.70	
RC03	-	-	SAND & GRAVEL / SANDSTONE	4.15 – 4.20	
RC04	5.50	SAND & GRAVEL	SAND & GRAVEL / SANDSTONE	3.65 – 3.75	
RC05	7.50	CLAY	CLAY	4.05 - 4.10	
WS08	-	-	SAND	DRY	
WS11	-	-	CLAY	DRY	
WS12	-	-	SAND	DRY	
WS13B	-	-	SAND	DRY	

Table 5.7 - Groundwater Noted During Site Investigation

- No groundwater encountered.

* No installs for monitoring long term.

RC Rotary Core Follow on (any location installs will be shown within the recorded rotary borehole).

5.8 Aggressive Ground Conditions

The classification of the site in terms of concrete in aggressive ground is based on the guidance provided in Table C2 of the Building Research Establishment (BRE) Special Digest 1, third edition of 2005. Table 5.8 details the classification.



Table 5.8 - Aggressive Chemical Environment for Concrete (ACEC) Site Classification

Stratum	Design Sulphate Class	ACEC Class (1)	
MADE GROUND	DS-1	AC-1	
RESIDUAL SOILS	DS-1	AC-1	

(1) ACEC assessment was based on the (mobile) groundwater condition for the scheme area

5.9 Additional Trial Trench Investigation

Trial trenching was undertaken on the 3rd and 4th January 2018 at the request of the client. This was to determine the extent and type of foundations and / or floor slabs that are still present below the existing surface of the site. The findings are summarised in table 5.9 below. The exploratory hole location plan & logs can be found in Appendix A1 & A2, respectively.

Exploratory Hole	General Ground Conditions	Obstruction Encountered	Depth of Obstruction (m bgl)
TT01	Gravel hardcore underlain by 0.15m of a brown gravelly CLAY with brick and concrete. This was underlain by 1.85m of brick and concrete demolition rubble.	0.90m thick concrete slab. This was broken through and is underlain by a natural gravelly CLAY layer.	2.05
TT02	Gravel hardcore underlain by 0.15m of a brown gravelly CLAY with brick and concrete. This was underlain by 3.20m of brick and concrete demolition rubble.	Round brick ducting following the line of the boundary wall. Possible 6-inch water pipe, potentially connected to the pipe located within the manhole at 5.50m depth in the south-east corner of the site.	3.40
TT03	Black asphalt underlain by 3.00m of brick and concrete demolition rubble.	0.30m thick concrete slab. This was broken through and is underlain by a natural gravelly CLAY layer.	3.10
TT04	Asphalt underlain by 2.90m of brick and concrete demolition rubble.	0.40m thick concrete slab. This was broken through and was underlain by a natural silty CLAY.	3.00
TT05	Gravel hardcore underlain by 1.30m of brick and concrete demolition rubble.	Trial pit terminated at 1.40m bgl due to potential live lighting cable or electric cable for ticket machine. Could not be advanced further.	1.40
TT06	Gravel hardcore underlain by 0.20m of brick and concrete demolition rubble.	Trial pit terminated at 0.30m bgl due to live electricity cable in the pit. Could not be advanced further.	0.30

Table 5.9 – Summary of findings for trial trench investigation

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TT07	Gravel hardcore underlain by 2.90m of brick, concrete, steel and rebar demolition rubble.	Concrete slab encountered at 3.00m bgl. Thickness could not be proven due to side walls of trial pit collapsing in.	3.00
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6.0 Ground and Groundwater Contamination Assessment

This section of the report includes the assessment of the potential contamination, solid, liquid and gas, identified on the subject site which may present a risk to the proposed end users, associated utilities and the wider environment.

In guidance published by the Environment Agency, the risk to human health or controlled waters is determined through an assessment of pollutant linkages between a source of contamination (within the ground or groundwater either on or off site) and a sensitive receptor such as end users of the site, building materials, edible plants grown in gardens or groundwater abstracted for drinking. This is termed a source-pathway-receptor relationship. The same model is applied to the assessment of risk arising from ground gases as detailed within BS8576:2013 (Ref.5).

These models have a common approach, which is one of a tiered assessment. At each stage of the assessment further detail can be applied to the conceptual site model to provide a detailed interpretation on a site by site basis. As part of the planning process this approach is adopted to establish either if the site is 'suitable for use' or whether additional work or else remedial work is required for the site to be deemed so.

The sub-sections hereafter therefore incorporate the first tier (Tier 1) of this approach otherwise referred to as the Generic Quantitative Risk Assessment (GQRA). The GQRA builds on the qualitative risk assessment presented in the Phase 1 Desk Study in conjunction with observations made during the ground investigation and is based solely on the results of the chemical and other testing data obtained as part of Curtins ground investigation. The GQRA is used to build/refine the Conceptual Site Model (CSM) for the site as detailed and presented in section 8.0 of this report.

The following sections present more detail on the risk assessment methodology rationale for the main receptors.

6.1 Human Health GQRA

Detailed guidance on human health risk assessment is available within several documents, published by both the Environment Agency and Defra. Guidance includes Contaminated Land Exposure Assessment (CLEA) v1.071 model (Ref.6), Science Report 2 (Ref.7) and Science Report 3 (Ref.8).

A generic quantitative risk assessment (GQRA) has been carried out for the Potential Contaminant Linkages (PCLs) investigated by screening of soil contamination data against relevant Generic Assessment Criteria (GAC) where available, including:

i) Soil Guideline Values (SGVs): These have been published by the Environment Agency and are trigger values for screening out low risk areas of land contamination. SGV's give an indication of representative average concentrations of chemicals in soil, below which long-term health risks are likely to be minimal. SGVs have been published for several contaminants including arsenic, cadmium, mercury, nickel, selenium, BTEX, phenols and dioxins, furans and

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dioxin-like PCB substances for land uses including residential, allotments and commercial. The SGVs have been developed for a sandy loam soil with 6% soil organic matter (SOM) content;

- ii) Supplementary Screening Values (SSVs): In addition to the SGVs developed by the EA, other third-party organisations have derived SSVs for a wider range of contaminants and land uses using the CLEA Model. Curtins have adopted these numbers where applicable, including those developed by Atkins AtriskSoil[™], the LQM/CIEH Suitable for Use Levels (S4UL) and EIC/AGS/CL: AIRE published thresholds;
- iii) Category 4 Screening Levels (C4SLs): In March 2014 Defra published C4SLs for arsenic, benzene, benzo(a)pyrene, cadmium, hexavalent chromium and lead. These values were derived to support the revised Part 2A Statutory Guidance issued in 2012 (Ref.9) in which four categories of contaminated land are included, ranging from Category 1 (significant/high risk) to Category 4 (low risk). C4SLs are not representative of significant possibility of significant harm (SPoSH) and are low risk levels which, and therefore where the C4SLs are not exceeded, land can be demonstrated to be in Category 4 and cannot be determined as contaminated land.

6.1.1 Adopted Soil Human Health GACs Screening Methodology

The use of the site, noted as a PRS scheme for 504 residential developments (406 PRS and 98 open market) with lower ground car parking. This considered to be most analogous with a *Residential without homegrown produce* end-use scenario and so assessment has been undertaken against the following GACs, in order of preference:

- 1. Environment Agency Soil Guideline Values,
- 2. CL: AIRE, AGS, EIC. Soil Generic Assessment Criteria for Human Health Risk Assessments,
- 3. LQM/CIEH 2015 S4ULs for Human Health Risk Assessment, and
- 4. DEFRA Category 4 Screening Levels.

The soil organic matter (SOM) content has an influence on the volatilisation of organic contaminants (i.e. the higher the SOM, the lower the volatilisation rate and therefore inhalation exposure risk). Soil organic matter (SOM) values for the site soils ranged significantly from <0.1% to 39%. The high organic content encountered in the many soils is representative of the made ground features. With consideration for a calculated geometric average, made ground determine an SOM of 4.74% while natural soils maintain generally a lower valuation however higher average of 9.97%. As such, a comparison against Tier 1 thresholds for a residential without the consumption of produce SOM of 6.0% for a residential end use has been adopted for both made ground and natural soil features.

The adopted GAC's are listed in Appendix A6.

Many of the exposure pathways considered in the CLEA model assume that the adult or child is in contact with the contaminated ground or that such contamination is easily mobilised from 063793-CUR-00-XX-RP-GE-00001 Former Kent Street Baths, Birmingham

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the surface. However, plant uptake of chemicals and the release of soil vapour may occur from greater depths. Although, the highest density of roots occurs in the top 80 cm, many crop plant root depths are between one and two metres. Although the transport potential degreases, vapours have the potential of migrating to the surface over distances of tens of metres (Updated technical background to the CLEA model - SC050021/SR3).

6.1.2 Generic Assessment Criteria Screening of Soil Laboratory Results

The results of the environmental testing can be referred to in Appendix A3.

With respect to the proposed end use of the site, a significant number of exceedances are noted within recovered soil samples as detailed below.

Exploratory Hole ID	Depth (m bgl)	Stratum	Determinant	Concentration (mg/kg)	Curtins GAC (mg/kg)
WS01 / RC01	1.70	RESIDUAL SOILS	Mercury Benzo(a)Pyrene	2.0 3.5	1.0 3.2
WS03 / RC03	0.50	MADE GROUND	Asbestos Lead Mercury	Chrysotile <0.001% 310 8	Detection 310 1
WS04 / RC04	0.30	MADE GROUND	Dibenzo(ah)Anthracene Lead	0.60 710	0.32 310
TP03	0.50	MADE GROUND	Cyanide Asbestos	45 Chrysotile <0.001%	34 Detection
TP06	0.50	MADE GROUND	Lead Mercury Benzo(b)fluoranthene Benzo(a)pyrene Dibenzo(ah)Anthracene	370 3 11 13 3.6	310 1 4.0 3.2 0.32
TP07	0.10	MADE GROUND	Benzo(b)fluoranthene Benzo(a)Pyrene	8.6 9.1	4.0 3.2

Table 6.1.2 - Soil Tier 1 Exceedances for a Commercial End Use



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Exploratory Hole ID	Depth (m bgl)	Stratum	Determinant	Concentration (mg/kg)	Curtins GAC (mg/kg)
			Dibenzo(ah)Anthracene	2.9	0.32
TP08	0.50	MADE GROUND	Lead Asbestos	750 Chrysotile <0.001%	310 Detection
WS11	1.00	MADE GROUND	Benzo(a)Pyrene Dibenzo(ah)Anthracene	4.4 1.0	3.2 0.32
WS07	0.30	MADE GROUND	Benzo(a)Pyrene Dibenzo(ah)Anthracene	3.8 1.1	3.2 0.32

Selected soil samples were screened for asbestos. Three asbestos containing materials (ACMs) were identified in the exploratory hole logs and laboratory screening confirmed that Chrysotile asbestos was present in the soil samples tested all at concentrations of <0.001%.

The above results table indicates that in the soils there are elevated metals, primarily lead and mercury when compared to an elemental threshold due to previously varied workshop and industries on and adjacent to site. There is also a singular case of elevated cyanide.

Poly Aromatic Hydrocarbons (PAHs) are elevated for a number of different species on a site wide basis with exceedance levels generally slightly over the thresholds. Particularly Benzo(a)Anthracene, Benzo(a)Pyrene and Benzo(b)Fluoranthene.

6.2 Controlled Waters GQRA

A model for assessing the potential for pollution of controlled waters and for deriving a safe concentration in ground and groundwater is the Environment Agency's publication "Remedial Targets Methodology - Hydrogeological Risk Assessment for Land Contamination' (Ref. 14)

In relation to the standards for controlled waters, there are currently no generic groundwater standards or surface water standards that are necessarily applicable to all sites.

However, dependant on the receptor identified as being at risk, see section 6.2.1, Surface Water (Abstraction for Drinking Water (Ref.15)) and/or Water Framework Directive Water Quality Standards (WFD WQS) (Ref.16) can be utilised as primary screening values in a Level 1 assessment.

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In addition to surface and groundwater samples a soil leaching test can be undertaken to provide a preliminary, conservative, assessment of the potential for contaminants in the soil to pollute ground or surface water. Leachate test results are screened in the same way as for groundwater above.

6.2.1 Adopted Controlled Waters Tier 1 Screening Values and Methodology

The results of laboratory analysis of groundwater, have been assessed against water framework directive (WFD) WQS. In the absence of WFD WQSs, UK Drinking Water Standards have been utilised.

The adopted Level 1 Screening Values are listed in Appendix A6.

6.2.2 Tier 1 Screening of Groundwater Laboratory Results

The results of the environmental testing can be referred to in Appendix A3.

With respect to the proposed end use of the site, a few exceedances are noted within recovered groundwater samples as detailed below.

Determinands	Tier 1 Value (µg/l)	Min Conc. (µg/l)	Max Conc. (µg/l)	Samples > Tier 1 Value
Chromium	50	<1	92	RC03 92µg/l
Boron	0.3	0.35	0.85	RC01 0.35 RC02 0.85 RC03 0.62 RC05 0.69
Sulphate	250	84	500	RC02 500 RC05 270

 Table 6.2.2 - Groundwater WQS Exceedances

Exceedances are present within tested groundwater samples with Chromium, Boron and Sulphate detected slightly above worst-case scenario thresholds but are considered to pose a moderate / low risk to controlled waters.

6.3 Water Supply Pipe Assessment

With reference to the UKWIR publication 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites' document reference 10/WM/03/21 advice is given on the appropriate materials for these ground conditions.

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Due to the general contamination recorded within the site shallow soils it is recommended that 'Barrier (PE-AI-PE) pipe would be suitable materials for the water supply pipes. The exact requirements are to be confirmed with the relevant utility supplier.

6.4 Materials Management

6.4.1 Re-use of Site Soils

Based on the geochemical testing results presented as part of this investigation it is considered that there is no specific requirement to remove soils from site because of them presenting an unacceptable risk to human health or the environment.

The re-use of site-won soils may therefore be undertaken if the following principles are met: i) the geotechnical suitability of the material needs to be confirmed; ii) the re-use of the material needs to be covered as part of the planning approval, e.g. site levels maintained within agreed limits; iii) the volume of the material being re-used needs to be confirmed and traceable and iv) regulatory approval from the relevant authorities has been sought. These principles are outlined within the CL: AIRE Definition of Waste Code of Practice (v2) and if and where the re-use of site-won soils is proposed as part of the development works it is recommended that a Materials Management Plan is produced in line with the Definition of Waste Code of Practice to detail and document the process.

6.4.2 Material Classification

Where any site soils are to be disposed of off-site guidance on the disposal of contaminated soils is provided within the following document published by the Environment Agency, the Guidance on the classification and Assessment of Waste Technical Guidance WM3 (1st Edition 2015) (Ref.17).

Guidance states that the principal contractor (or any other sub-contractor undertaking excavations) should, in conjunction with the proposed disposal facility, use where possible the relevant environmental chemistry analyses results to classify any surplus material identified for off-site disposal. However, it should be noted that this information is for guidance only and material identified for disposal will have to be tested and assessed in accordance with WM3 to enable classification during the works.

An initial assessment for the waste classification of the shallow and deeper made ground soils encountered on site has been carried out through a comparison of the soil testing results against the Tier 1 Thresholds and using the Waste Soils Characterisation Assessment Tool, Cat-WasteSoil, developed by McArdle and Atkins. This online tool gives a rapid assessment of contaminated soils and their classification as either hazardous or non-hazardous (stable non-



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reactive hazardous waste) waste, it should be noted that this tool does not classify inert waste. Persistent Organic Pollutants (POP's) were not tested for as part of the investigation, however based on the Conceptual Site Model the risk of these being present on the site is considered moderate.

Exploratory Hole Location & Depth (m bgl)	Strata	Waste Classification	
WS04 – 0.30	MADE GROUND	Hazardous – HP14 ⁽¹⁾	
TP02 – 0.30	MADE GROUND	Hazardous – HP07 ⁽²⁾	
TP03 – 0.50	MADE GROUND	Hazardous – HP14 ⁽¹⁾	
TP06 – 0.50	MADE GROUND	Hazardous – HP14 ⁽¹⁾	

Table 6.4.2 – CatWaste Hazardous Waste Zones

(1) Ecotoxic – Waste which presents or may present immediate or delayed risks for one or more sectors of the environment.

(2) Carcinogenic – Waste which induces cancer or increases its incidence.

The initial assessment revealed that of the fourteen made ground soils tested, four samples have indicated to be hazardous waste for off-site disposal purposes with respect to Environment Agency waste classes, using the guidance given in WM3. The remaining ten soil samples are classed as non-hazardous waste for off-site disposal purposes.

Of the eighteen samples, four were of the natural strata. This is recorded to be non-hazardous waste with regards to off-site disposal purposes.

As discussed, preliminary waste classification is undertaken to offer indicative advice with respect to disposal requirements. Landfill operators are not obliged to accept waste and, if they were to do so, may have specific requirements beyond those outlined above prior to acceptance. Landfill operators should be contacted to confirm the above classifications or otherwise.


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7.0 Ground Gas Assessment

The assessment of risk presented by ground gases is assessed with reference to guidance published by CIRIA (Assessing Risks Posed by Hazardous Ground Gases to Buildings, C665 (Ref.10), BSI Publication (Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings BS8485:2015 (Ref.11) and other broadly accepted references such as the Ground Gas Handbook 2009 (Ref.12).

The gas risk assessment adopts a tiered approach. In the first instance, this involves a re-evaluation of the Conceptual Site Model described within the Phase 1 Preliminary Site Assessment (desk study) and thereafter validating this conceptual model with the ground gas data, the semi-quantitative risk assessment.

7.1 Land Gas Monitoring Results

To characterise the site's ground gas regime and validate the qualitative assessment of ground gas risk standpipe installations were incorporated within the four window sample borehole locations and five window sample with rotary core follow on locations as detailed in Section 5.3.

An initial programme of six gas monitoring visits over three months was proposed. The gas monitoring schedule has now been completed with visits undertaken between, with barometric pressure recorded between 996 and 1018 mb and the monitoring period included one monitoring visit during heavy precipitation. The results log sheets are contained within Appendix A5 and summarised in Table 7.1 below:

Location	Maximum Methane Concentration %	Maximum Carbon Dioxide Concentration %	Minimum steady reading (Oxygen)	Maximum gas flow I/hr
WS08	<0.1	2.5	16.6	0.0
WS11	<0.1	0.1	17.3	0.0
WS12	<0.1	2.4	17.1	0.0
WS13B	<0.1	5.7	15.5	0.0
RC01	<0.1	10.6	4.0	0.0
RC02	<0.1	0.3	19.7	0.0
RC03	<0.1	0.2	20.2	0.0
RC04	<0.1	4.3	7.9	0.0
RC05	<0.1	1.0	14.5	0.0

Table 7.1 - Summary of Ground Gas Monitoring Results



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Methane (CH4), carbon monoxide (CO) and hydrogen sulphide (H2S) were recorded below the instrument's detection limit within all the monitoring wells throughout the monitoring period. Carbon Dioxide was recorded in peak concentrations between 0.1% and 10.6%. No gas flow was encountered above the detection limit of the gas monitor 0.1l/hr.

The highest concentrations of carbon dioxide were consistently recorded from RC01 in the south-west of the site, with a peak value of 10.6%. Elsewhere, concentrations of carbon dioxide were recorded between 0.1% and 5.7%.

7.2 Land Gas Assessment

The Conceptual Site Model presented within the Phase I Preliminary Site Assessment identified possible made ground deposits as a potential source of Ground Gas generation both on-site and offsite resulting from historical development and land use. The report suggests no potential of organic rich drift deposits being present. Additionally, coal deposits are noted to not underlie the site. Noxious and asphyxiate gases were attributed to include, but not limited to, carbon dioxide, carbon monoxide, methane and hydrogen sulphide. The consequence was evaluated as a Moderate/Low risk.

Made Ground soils were encountered to depths of between 0.37 m to 3.30 m bgl but with limited putrescible content generally. The ground investigation revealed a ground model generally consistent with the preliminary conceptual site model. Natural deposits were generally sand and gravel with no significant putrescible/organic content.

Consideration of the recorded soil gas flow rates, presented above, enables hazardous gas flow rates to be evaluated. Q_{hg} can be derived for both 'worst credible' and 'worst possible' scenarios and a comparison made in support of an appropriate assessment of ground gas risk. For a 'worst credible' scenario steady state flow rates are adopted, whilst for a 'worst possible' scenario peak flows are adopted. Evaluation of the 'worst credible scenario' (highest hazardous gas flow rate that is realistically possible, i.e. in a single borehole) records a maximum Q_{hg} of 0.0057 l/hr for carbon dioxide.

Evaluation of the 'worst possible scenario' (highest Q_{hg} across the entire dataset irrespective of location and discrete monitoring events) records a maximum Q_{hg} of 0.0010 l/hr for carbon dioxide.

This worst possible scenario has been adopted as the sites Gas Screening Value (GSV) and in accordance with an assessment by CIRIA C665 the GSV indicates a Characteristic Situation 2 (CS2) gas regime which requires gas protection measures.

The potential risks from ground gases to the excavations are to be dealt with by the Contractor, in accordance with the Confined Space Regulations, during construction. Appropriate ground gas

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monitoring and safety measures should be in place during the works, as the potential presence of ground gases could pose a risk in any confined spaces of deep excavations.

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8.0 Revised Conceptual Site Model

The Preliminary Conceptual Site Model (PCSM) presented in the Phase 1 report (Ref. 18 063793-CUR-00-XX-RP-GE-00001-V02_Phase 1 PSA) and discussed in Section 2.0 of this report has been revised following the GQRA in Section 7.0 above. The Revised Conceptual Site Model (CSM) is summarised in the table overleaf and graphically presented.

The CSM details the source-pathway-receptor linkages or potential pollutant linkages (PPL) that have been identified as relevant for the site. The GQRA details the associated level of risk relating to these potential pollutant linkages.

The CSM follows the framework outlined within CIRIA C552 which is summarised within Appendix A7.

The 'risk rating' within the CSM refers to the risk that the source, pathway, receptor linkage or PPL is complete. Unless specifically stated it does not necessarily refer to an immediate risk and is intended to be used as a tool to assess the necessity for further assessment/investigation.

Under current health and safety legislation, employers are required to carry out their own appropriate risk assessments and mitigation to protect themselves and their employees, other human receptors and the environment from potential contamination. Such risks must be adequately mitigated by law, specifically the Construction Design Management (CDM) Regulations, 2015 which require that potential risks to human health and the environment from construction activities are appropriately identified and all necessary steps taken to eliminate / manage that risk. It has been assumed that any future construction works on site will be undertaken in compliance with these requirements and therefore construction workers involved in the building works at the site have been discounted as a human receptor in the conceptual site model. Reference should be given to the environmental testing results discussed within Section 8.0 and presented within *Appendix A3*.

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| Qualitative Risk
Assessment | Generic
Quantitative
Assessme | Risk
nt | Detailed
Quantitative Risk
Assessment or;
Remedial Action | |
|--------------------------------|-------------------------------------|------------|--|--|
|--------------------------------|-------------------------------------|------------|--|--|

- The table below represents the Second stage in the land quality risk assessment process; the Revised Conceptual Site Model following the Quantitative Risk Assessment.
- For a development site to be deemed 'suitable for use' the level of risk needs to be brought down to acceptable levels, i.e. low to negligible risk. The purpose of each stage of risk assessment is ultimately to establish if there is a requirement for additional levels of assessment to be made to have sufficient confidence to support a risk characterisation or management decision, e.g. remedial action.

| | Conceptual Site Model | | Generic | Qualitative Risk Assessment | | | |
|--|--|---|--|--|-------------------|---|--|
| Identified Source | Pathway(s) | Receptor(s) | Consequence (with explanations, if applicable) | Likelihood of Occurrence (with explanations if applicable) | Risk Rating | Comments | Action |
| Made ground including
fragments of brick,
clinker, quartzite, flint | Direct contact and dermal uptake,
soil and dust ingestion, dust &
migration inhalation (indoor &
outdoor air) | Residential end users
(without plant uptake) | Medium | Low | Moderate /
Low | Hardstanding Development with potential
or materials removals and soft
landscaping with imported topsoil
removes potential pathway linkage | Generic Quantitative Risk Assessment
(GQRA) post further site investigations |
| glass, coal, slag,
concrete, slate, plastic,
ceramic tiles, metal and
wood [containing
asbestos fibres, elevated
concentrations of heavy
metals (e.g. lead) and
PAHs] | Direct contact and dermal uptake,
soil and dust ingestion, dust &
migration inhalation (outdoor air) | Construction and maintenance workers | Medium | Low | Moderate /
Low | Correct allocation and implementation of
standard PPE and site health a safety
rules will reduce potential risk to nominal
levels. | Generic Quantitative Assessment post
further site investigations
Standard Health & Safety precautions
likely to be used by workers. |
| | Soil dust ingestion/inhalation
produced during construction
(indoor and outdoor air) | Adjacent residents | Medium | Low (reflecting the low concentrations found to date | Moderate /
Low | Minimal ground gasses encountered with nominal gas flows | Generic Quantitative Assessment post
further site investigations |
| Organic matter and/or
contamination as source
material for the | Residential end users | | Medium | Low (reflecting the low concentrations found to date | Moderate /
Low | Minimal ground gasses encountered with nominal gas flows | Generic Quantitative Assessment post
further site investigations |
| generation of ground gas
in the former petrol
station area | (Ground gas & vapour) migration
and inhalation | Construction and maintenance workers | Medium | Low (reflecting the low concentrations found to date | Moderate /
Low | Minimal ground gasses encountered with nominal gas flows | Generic Quantitative Assessment post
further site investigations |
| Organic matter and/or
contamination as source
material for the | | Residential end users | Medium | Low (reflecting the low concentrations found to date) | Moderate /
Low | Minimal ground gasses encountered with nominal gas flows | Generic Quantitative Assessment post
further site investigations |
| generation of ground gas
in remaining parts of the
site | | Construction and maintenance workers | Medium | Unlikely (reflecting the low concentrations found to date) | Low | Minimal ground gasses encountered with nominal gas flows | Generic Quantitative Assessment post further site investigations |
| Unexploded Ordnance
During WWII, the site | | Residential end users | Severe | Low | Moderate | End user have no reason to be disturbing ground with potential to encounter UXO. | No further action required |
| During WWII, the site
was in an area of
moderate bombing
density, however
after assessment, the
site is in a low risk area. | Direct contact through all groundwork activities | Construction and maintenance workers | Severe | Likely | High | Area is at high risk from UXO. No UXO
encountered during work however this
does not mitigate the risk for potential
UXO presence. | Full time UXO specialist supervision and
advice should be utilised in conjunction
with a full detailed UXO report is
essential for any site works involving the
disturbance of ground. |



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8.1 Summary of Significant Pollutant Linkages

Site works highlighted made ground contaminations with several exceedances. End use of the site involves hard standing development with soft landscaping likely to utilized offsite topsoil. This removes pollutant linkages mitigating risk to end users and the public, construction worker uses of standard PPE and site health and safety will mitigate risk. Ground gas generation is shown to be minimal on site with low gas generation and nominal flow rates detected on site. End users are at no risk whilst construction workers are likely to utilize PPE to mitigate the risks. As such on generation of ground gases poses a minimal risk. Unexploded ordinance remains a high risk as detailed UXO reports have place the site in a high-risk area. No UXO was encountered during works however this does not mitigate the potential risk to future works that disturb ground. As such full UXO protections, monitoring and preventions measures should be used during all works disturbing ground.

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9.0 Engineering Assessment and Recommendations

9.1 Introduction

This section will assess the relevant geotechnical issues for the proposed residential development. The proposed development plan is contained within Appendix A1. The engineering assessment considers (foundation design, bearing capacity, settlement, excavations, earthworks and pavement design) for the site. Structural details and loadings have not yet been provided. It should be noted that detail may change in the development of designs beyond the issue of this Phase 2 Report and the Construction designer should satisfy themselves regarding the adequacy of their design and proposed approach to construction by reference to the on-going project design proposals, the site investigation information and their own examination of the site.

9.2 Summary of Ground Conditions

The ground conditions at the site generally comprised Made Ground to an average depth of 1.89mbgl, over SAND and GRAVEL residual soils to an average depth of 9.30mbgl, underlain by Bromsgrove SANDSTONE to an unconfirmed depth of 22.66mbgl. Groundwater is relatively shallow recorded between 3.65 - 4.20mbgl to date.

9.3 Excavations & Support

Excavation through layers of made ground and residual soils encountered across the site should be feasible using conventional site plant. An allowance should be made for breaking out concrete which may be encountered across the site.

Buried obstructions in the ground are present across the site. These obstructions are thought to be related to the previously destroyed, demolished and backfilled historical public baths. Obstructions comprise brick and concrete structures that will require breaking and removal should development be necessary in these areas.

Although no blowing or running sand conditions were recorded during the site investigations, running sand conditions may be prevalent across the site where excavations for buried structures intercept the SAND and GRAVEL residual soils present across the site. Adequate excavation support together with groundwater control will be necessary to prevent sands from flowing into the excavation leading to settlement of the surrounding ground.



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Based on observations on site, together with the results of in-situ and laboratory tests, it is considered that excavations to less than 1.20 m depth from current ground levels are unlikely to stand unsupported due to the loose granular nature of the made ground. Side support such as sheeting could be considered. Side support for safety purposes should of course be provided to all excavations which appear unstable, and those more than 1.20m deep, in accordance with Health and Safety Regulations.

9.4 Foundation Design

The investigation has proved consistent made ground levels to depths between surface level to 3.50m bgl. The deepest made ground (4.50m) was encountered in RH02. It is likely but not currently known that the buildings will be multi storey resulting in high loads. Conventional shallow spread foundations are unlikely to be suitable for the support of the anticipated structural loads. It is recommended that piled foundations are used to transfer structural loads to competent strata. Dependent on loadings it may be necessary for piles to be embedded into sandstone bedrock. Sandstone bedrock was encountered at depths in the range of 6.90m to 11.60m bgl. The carrying capacity of piles depends not only on their size and the ground conditions but also on their methods are often employed before they reach the public domain, perhaps several years down the line. It is recommended that specialist Piling Contractors be contacted as to the suitability and carrying capacity of their piles in the ground conditions pertaining to the site.

9.5 Ground Floor slabs

As piled foundations are anticipated then the use of floor slabs bearing on the pile caps by a network of beams will minimise any differential settlements between the floor and the piled structure.

9.6 Chemical Attack on Buried Concrete

The site has been classified in accordance with BRE Special Digest 1, brownfield without the presence of pyrite and laboratory testing undertaken accordingly. It is recommended that the guideline given in BRE Special Digest 1 be adopted.

Based on laboratory test results it is considered that a Design Sulphate Class for the site may be taken on DS-1. The site conditions would suggest that an ACEC class for the site of AC-1 would be appropriate.



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9.7 Pavement Assessment

Based on in-situ testing and site observations, it is recommended that a CBR value of 2.5% is adopted for preliminary design purposes. This should be confirmed through testing prior to road and hardstanding design with localized soft spots expected. As made ground is variable it is suggested that the formation be proof rolled prior to the installation of required sub-base layers. It is considered that with proof rolling higher CBR values may be achievable, this should be confirmed with additional testing.

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10.0 Conclusions & Recommendations

10.1 Conclusions

A revised tabulated revised Conceptual Site Model has been derived following the findings on the Generic Quantitative Risk Assessment risk assessment and is presented in Section 8.0.

10.1.1 Geotechnical Assessment

Based on observations made on site, together with results of in-situ and laboratory tests, it is anticipated that a piled foundation solution may be adopted transferring the high structural loads to the sandstone bedrock. Due to the depth of made ground encountered suspended floor slabs should be considered for the proposed structures.

Laboratory test results indicate that a Design Sulphate Class for concrete maybe taken as DS-1 and ACEC class of AC-1 would be appropriate.

10.1.2 Ground and Groundwater Contamination

The environmental chemistry soil results have been compared with the Tier 1 criteria for soils with respect to human health against 'Residential without home grown produce' thresholds. With respect to the proposed end use of the site Tier 1 thresholds have been exceeded in made ground samples on a site wide basis, particularly PAHs, Lead and to a lesser extent Mercury, Cyanide and Asbestos. These concentrations are likely to be associated with brick and concrete cobble made ground and may pose a risk if future site users become exposed to these soils, primarily in landscaped areas. It is considered that the risk presented to site end users from made ground soils on site will be Moderate. Therefore, a suitable 600mm layer of clean and inert topsoil should be used, which is underlain by a Hi-visibility geotextile marker layer in any managed soft landscaping areas.

10.1.3 Ground Gas Assessment

Four gas monitoring visits have been undertaken, with maximum carbon dioxide concentration of 10.6% v/v and no flow has been recorded. The risk to the end user the development site from soil gases is therefore considered to be Moderate. The gas regime for the site is CS2, requiring gas protection measures.

The BGS Radon Mapping confirms the site is situated in an area where less than 1% of homes are above the radon action level. Radon protection measures are therefore not considered necessary within new dwellings or extensions. However, where the new development incorporates a basement the advice of a specialist Radon assessor must be obtained.

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10.2 Recommendations

Based on the findings of the ground investigation, the following recommendations are made:

- 1) The presence of elevated PAHs, Lead, Mercury and Asbestos, ash and clinker deposits within the made ground provided a moderate risk to the end users of the development. These localities can be located beneath the building construction and / or hardstanding, but where located in areas of proposed managed soft landscaping a clean and inert cover system with hi-visibility layer should be incorporated.
- 2) New water supply pipes will be required to be upgraded to barrier pipe.
- 3) It is recommended that construction workers are provided with appropriate PPE and sanitary facilities with reference to the environmental testing results presented herein and within *Appendix A3*.
- 4) Any developments will need to incorporate CS2 grade gas protection measures due to the levels of CO₂ present.
- 5) A Remediation Strategy will be required for the site to detail gas protection measures and clean and inert cover systems / relocation of potential contamination. A Verification Report will be required to record the installation of gas protection measures and independent verification works.

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11.0 References

1 Environment Agency (2004) Model *Procedures for the management of land Contamination Contaminated Land Report 11* (CLR11).

2 British Standards Institution (2011) *Investigation of Potentially Contaminated Sites* (report no. BS10175).

3 British Standards Institution BSI (2010) Code of Practice for Site Investigations (report no.BS5930).

4 British Standards Institution (2006) Eurocode 7: Geotechnical Design (report no. BS EN 1997).

5 British Standards Institution (2013) *Guidance on Investigations for Ground Gas, Permanent Gas and Volatile Organic Compounds (VOCs)* (report no.BS8576:2013).

6 Environment Agency (2014) Contaminated Land Exposure (CLEA) Tool (version 1.06).

7 Environment Agency (2009) *Human Health Toxicological Assessment of Contaminants in Soil* (report no. SC050021/SR2)

8 Environment Agency (2009) Updated Technical Background to the CLEA Model (report no.SC050021/SR3).

9 Department of Environment Food and Rural Affairs (DEFRA) (2012) *Environmental Protection Act* 1990: Part 2A Contaminated Land Statutory Guidance (report no. PB13735).

10 CIRIA (2007) Assessing Risks Posed by Hazardous Ground Gases to Buildings (report no. C665)

11 British Standards Institution (2015) *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings* (report no.BS8485).

12 S Wilson, G Card, S Haines (2009) *Ground Gas Handbook* Cathness, Scotland, Whittles Publishing.14 Environment Agency (2006) Remedial *Targets Methodology - Hydrogeological Risk Assessment*

for Land Contamination (report no.ea/br/e/std/vr10thanni)

15 Water, England and Wales (2000) *The Water Supply (Water Quality) Regulations 2000* (report no. 3184)

16 Water quality standards as per Water Framework Directive Regulations 2015.

17 Environment Agency (2015) *Guidance on the Classification and Assessment of Waste Technical Guidance WM3* (1st Edition 2015)

18 Curtins Phase 1 Preliminary Site Assessment Ref: 063793-CUR-00-XX-RP-GE-00001-V02_Phase 1 PSA

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Appendix A1 – Drawings

- Curtins drawing ref. 063793-CUR-00-XX-DR-GE-00001-V04_Exploratory Hole Location Plan.
- Development Plans ref. 2102-A-L-100 Rev 00





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Appendix A2 – Exploratory Hole Logs

- Rotary Borehole Logs, RC01 to RC05.
- Window Sample Borehole Logs, WS01 to WS13B.
- Trial Pit Logs, TP01 to TP08.
- Trial Trench Logs, TT01 to TT07.

| | | | | | | | | Trialpit N | lo |
|--|---|---------------------|-----------------------|--------|---------|--------|--|-------------------------------|-----|
| | | | | | | Tri | al Pit Log | TP01 | J |
| | | | | Ducies | 4 N L - | | | Sheet 1 o | f 1 |
| Project
Name: | Kent Stre | eet, Birr | ningham | B0637 | 1 NO. | | Co-ords: - | Date
18/05/20 ² | 17 |
| | . Land No | rth of K | ont Street Birmingham | | | | Dimensions 2 | Scale | |
| | | | | | | | (m):
Depth | <u>1:25</u> | 4 |
| Client: | Camborr | ne Lanc | Investments | | - | | 3.50 | ST | 1 |
| ke te | Sample | s and | n Situ Testing | Depth | Level | Legend | Stratum Description | | |
| Va
Stri | Depth | Туре | Results | (m) | (m) | g | | | |
| VV State of the st | Depth
0.10
0.50
1.00
2.00
2.00 | ES
ES
B
ES | Results | 0.20 | | | MADE GROUND: Black sand and gravel of fine coarse, angular to rounded ash, limestone, bric concrete and quartzite. MADE GROUND: Brown gravelly fine to coarse Gravel is fine to coarse, angular to rounded bric concrete, quartzite and flint. With occasional an subangular brick cobbles. Light grey silty gravelly fine to medium SAND. Of fine to coarse, subrounded to rounded flint and Bellow 2.10mbgl becomes orange brown. End of pit at 3.50 m | Sand.
sk,
gular to | 1 |
| Remarks | s: Pit dry | / | | | | | | | 5 - |
| Stability: | : Pit sta | able | | | | | | AG | S |

| | | | | | | | | Trialpit N | ٩٥ |
|------------------|-------------|-----------|----------------------------|------------|---------|--------|--|---|-------------------|
| | | | | | | Tri | al Pit Log | TP02 | |
| | | | | Droioc | ot No | | Co. ordo: | Sheet 1 c | of 1 |
| Project
Name: | Kent Str | eet, Birn | ningham | B0637 | 793.002 | | Level | 18/05/20 | 17 |
| | on: Land Mo | orth of K | ant Street Birmingham | 1 | | | Dimensions 3.1 | Scale | |
| | | | | | | | (m): | <u>1:25</u> | 4 |
| Client: | Cambor | ne Land | Investments | | | | 1.80 | ST | |
| ke te | Sample | es and I | n Situ Testing | Depth | Level | Legend | Stratum Description | | |
| Stri
Stri | Depth | Туре | Results | (m) | (m) | Logono | | | |
| | 0.50 | ES | | 0.10 | | | MADE GROUND: Black very gravelly fine to coa
sand. Gravel is fine to coarse, angular to rounde
concrete, wood, ceramics and quartzite.
MADE GROUND: Red brown sandy gravel of fir
coarse, angular to subrounded brick, concrete a
quartzite. With rare metal, old wires, old pipes a
With common cobbles of angular to subangular
concrete cobbles. Very large concrete boulder
encountered at 1.20mbgl forming obstruction. U
proceed. | arse
arse
by brick,
ne to
nd fabric.
brick and
nable to | 1 |
| Remari | ks: Pit dr | y. Old pt | ublic bath wall visible ir | n pit side | 25. | | | | 2 -
3 -
5 - |
| Stability | y: Pit ur | nstable. | Collapsing from surface | e | | | | AG | S |

| | | | | | | | | Trialpit I | No |
|----------|-------------|------------|-----------------------|------------|---------|--------|---|--|------|
| | | | | | | Tr | ial Pit Log | TP0 | 3 |
| | | | | Projoc | st No | | Co. ordo: | Sheet 1 | of 1 |
| Name: | Kent St | reet, Birr | ningham | B0637 | 793.002 | | Level: | 18/05/20 | 017 |
| Locatio | on: Land No | orth of K | ent Street, Birmingha | am | | | Dimensions 2.4 | Scale | ; |
| | | | | | | | (m):
Depth ∽ | 1:25 | d |
| Client: | Cambo | ne Land | Investments | | T | | 2.30 | ST | |
| ater | Sampl | es and I | n Situ Testing | Depth | Level | Legeno | Stratum Description | | |
| ŝ | Depth | Туре | Results | (11) | (11) | | | a to | |
| | 0.50 | B | | 2.30 | | | MADE GROUND: Black brown silty gravelly fine
coarse sand. Gravel is fine to coarse, angular to
concrete, brick, glass, metal, clinker, flint and qu
With occasional angular to subangular to subangu
and concrete boulders. | > to
> rounded
µartzite.
1
lar brick | |
| Remar | rks: Pit d | ry. Obstr | uction encountered a | at 2.30mbg | jl. | 1 | | | |
| Stabilit | ty: Pit u | nstable. | Collapsing from surfa | ace. | | | | AG | iS |

| | | | | | | | | Trialpit N | ٩٩ |
|------------------------|----------------------|-------------|------------------------|--------|---------|--------|--|---|--------|
| | | | | | | Tri | al Pit Log | TP04 | 4 |
| Draiget | | | | Projec | t No | | Co-ords: - | Sheet 1 c | of 1 |
| Name: | Kent Stre | eet, Birr | ningham | B0637 | '93.002 | | Level: | 18/05/20 |)17 |
| Location: | Land No | rth of K | ent Street. Birmingham | | | | Dimensions 3.5 | Scale | |
| | | | | | | | Depth O | 1:25
Logged | d |
| Client: | Camborr | ne Land | Investments | | | 1 | 3.50 | ST | |
| ater
rike | Sample | s and I | n Situ Testing | Depth | Level | Legend | Stratum Description | | |
| < ú | Берш | Type | Nesuits | 0.10 | | | MADE GROUND: Black brown gravelly fine to c
sand. Gravel is fine to coarse, angular to rounde | oarse
ed | - |
| | 0.50 ES | | | | | | sand. Gravel is fine to coarse, angular to rounde
limestone, concrete, brick and quartzite.
MADE GROUND: Red brown to brown gravelly
coarse sand. Gravel is fine to coarse, angular to
brick, concrete, and quartzite. With frequent ang
subrounded brick and concrete cobbles. With of
and wires. Bellow 2.0mbgl occasional angular to
subangular brick and concrete boulders. | ed
fine to
prounded
jular to
d pipes
o | |
| | | | | | | | | | 5 - |
| Remarks:
Stability: | : Pit dry
Pit sta | /.
able. | | | | | | AG | I
S |

| | | | | | | | | Trialpit | No | |
|-------------------|---|--------------|-----------------------|--------|---------|--------|---|---|-------------|--|
| | 6 | | | | | Tri | al Pit Log | TP0 | 5 | |
| Project | | | | Proiec | t No. | | Co-ords: - | Sneet 1
Date | <u>or 1</u> | |
| Name: | Ke | nt Street, B | irmingham | B0637 | 793.002 | | Level: | 18/05/20 | 017 | |
| Locatio | on: La | nd North of | Kent Street, Birmingh | nam | | | Dimensions 2.1 | Scale | Э | |
| | | | , 3 | | | | (m):
Depth | 1:25
Logge | ed | |
| Client: | Ca | mborne La | nd Investments | | 1 | | 0.37 | ST | | |
| ike | S | amples and | d In Situ Testing | Depth | Level | Legend | Stratum Description | | | |
| str
Str | Dep | th Typ | e Results | (m) | (m) | | | cond | | |
| | 0.30 |) ES | | 0.37 | | | MADE GROUND: Brown gravelly fine to coarse
Gravel is fine to coarse, angular to rounded bric
concrete and quartzite. With occasional angular
subangular brick and concrete cobbles. Concre
obstruction encountered at 0.37mbgl. Unable to
End of pit at 0.37 m | e sand.
ck,
r to
ete
b proceed. | | |
| | | | | | | | | | 5 - | |
| Remar
Stabilit | arks: Pit dry. Flat concrete obstruction encountered at 0.37mbgl. Large drain and substation in local area unable to relocate pit without posing significant risk to services or public vehicles. | | | | | | | | | |

| | | | | | | | | Trialpit N | No |
|----------------|--------------------|------------|-------------------------|--------------|--------------|----------|--|---|------|
| | | | | | | Tri | al Pit Log | TP0 | 6 |
| Droiget | | | | Projec | rt No | | Co-orde: | Sheet 1 c | of 1 |
| Name: | Kent Str | eet, Birn | ningham | B0637 | 793.002 | | Level: | 19/05/20 |)17 |
| Locatio | n: Land No | orth of Ke | ent Street. Birminghan |
ו | | | Dimensions 2.2 | Scale | |
| | | | , , | | | | Depth | 1:25
Logge | d |
| Client: | Cambor | ne Land | Investments | | 1 | | 1.70 | ST | |
| /ater
trike | Sample | es and li | n Situ Testing | Depth
(m) | Level
(m) | Legend | I Stratum Description | | |
| Remark | 0.50
ks: Pit dr | y. Pit col | lapsing at rate of exca | 0.10
1.70 | Jnable to | o proces | MADE GROUND: Black brown sandy gravel of
coarse, angular to rounded brick, limestone, cor
and quartzite.
MADE GROUND: Sandy gravely cobbles of ang
subangular brick and concrete. Gravel is fine to
angular to rounded brick, concrete, wood, metal
plastic, wires, old pipes and quartzite.
End of pit at 1.70 m | fine to
norete
gular to
coarse,
l, rebar, | 2 |
| Stability | y: Pit ur | nstable. (| Collapsing from surfac | e. | | | | AG | S |

| | | | | | | | | Trialpit | No |
|------------------|---------------------|---------------------|---------------------------|------------|----------|----------|--|--|---|
| | | | | | | Tri | al Pit Log | TP0 | 7 |
| | | | | <u> </u> | | | - | Sheet 1 | of 1 |
| Project
Name: | Kent St | eet, Birr | ningham | Projec | 21 NO. | | Co-ords: - | Date
18/05/20 | 117 |
| | un Lond N | with of 12 | ant Chroat Director above | 120001 | 00.002 | | Dimensions 3.2 | Scale | <u>, , , , , , , , , , , , , , , , , , , </u> |
| Locatio | on: Land No | | ent Street, Birmingham | | | | (m): | 1:25 | |
| Client: | Cambor | ne Land | Investments | | | | 1.20 | Logge
ST | a |
| e e | Sampl | es and I | n Situ Testing | Depth | Level | Lonono | | | |
| Wat
Strik | Depth | Туре | Results | (m) | (m) | Legend | MADE GROUND: Black sapdy gravel of fine to a | COARSO | |
| | 0.10 | ES | | 0.15 | | | Angular to rounded brick, concrete, ceramic and
quartzite.
MADE GROUND: Brown gravelly fine to coarse
Gravel is fine to coarse, angular to rounded brick
concrete, ceramic and quartzite. With common a
to subangular brick cobbles. With common angu
subangular brick boulders. With old cables, pipe
metal. | /
sand.
k,
angular
ular to
is and | 1 |
| Remar | ks: Pit di | y Collar | pse causing pit expansi | on enda | naerina | public v | End of pit at 1.20 m | | 2 |
| Remar | ks: Pit di
1.20i | 'y. Colla∣
nbgl. | ose causing pit expansi | on enda | angering | public v | ehicles in vicinity. Little progress pit terminated | l at | ם |
| Stabilit | y: Pit u | nstable. | Collapsing from surface |) . | | | | AC | 15 |

| | | | | | | | | Trialpit l | No |
|------------------|--------------------|------------------------|--|-----------|---------|---------|--|-------------------|------|
| | | | | | | Tri | al Pit Log | TP0 | 8 |
| | | | | Draias | t No | | Co. order | Sheet 1 | of 1 |
| Project
Name: | t Kent St | reet, Bir | mingham | B0637 | /93.002 | | Level: | 19/05/20 | 017 |
| Locatio | on: Land No | orth of K | ent Street Birmingham | | | | Dimensions 2.9 | Scale | ; |
| | | | | | | | (m):
Depth | 1:25 | d |
| Client: | Cambo | me Land | I Investments | | | | 2.00 | ST | u |
| ike r | Sampl | es and | In Situ Testing | Depth | Level | Legend | Stratum Description | | |
| 8
Str | Depth | Туре | Results | (m) | (m) | | | fina ta | |
| | 0.50 | ES | | 2.00 | | | MADE GROUND: Black brown sandy gravel of
coarse, angular to rounded limestone, brick, co
and quartzite.
MADE GROUND: Brown gravelly fine to coarse
Gravel is fine to coarse, angular to subrounded
concrete and quartzite. With frequent angular to
subangular brick cobbles. With rare wires, fabric
metals and glass. | Tine to
norete | |
| Remar | ks: Pit di
term | ry. Pit co
inated a | niapsing at rate of excant t 2.00mbgl. | vation. (| ollapse | causing | prit expansion causing public vehicle risk. Pit | | |
| Stabilit | ty: Pit sl | ightly ur | nstable. Collapsing from | surface | 9. | | | AG | iS |

| | | | | | | | | | Borehole No. |
|---------------|------------------|--|---------------|--|---|-------|-----------|--|--|
| | 6 | | | | | Bo | reho | ole Log | WS01 |
| Droio | t Name | Kant Otra | t Dime | | Project No. | | Co. ordou | | Hole Type |
| Projec | | Kent Stree | el, Birri | lingnam | B063793.00 |)2 | Co-ords: | - | WS |
| Locati | ion: | Land Nort | h of Ke | ent Street, Birming | gham | | Level: | | 1:50 |
| Client | : | Camborne | e Land | Investments | | | Dates: | 15/05/2017 - 15/05/2017 | Logged By
ST |
| Well | Water | Samples | s and I | In Situ Testing | Depth | Level | Legend | Stratum Descriptior | 1 |
| | Suikes | Depth (m) | Туре | Results | (11) | (11) | | MADE GROUND: Black gravelly fin | e to coarse |
| | | 0.50
1.20
1.70
1.70
2.00
3.00
3.00
4.00 | ES
D
ES | N=1 (2,2/1,0,0,0
N=15 (3,3/3,4,4,4
N=15 (6,6/4,5,2,4
51 (6,7/51 for
185mm) | (0.20
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(1. | | | MADE GROUND: Black gravelly fin
sand. Gravel is fine to coarse, angu
subrounded brick, concrete, asphal
limestone. With rare subrounded ar
flint and quartzite cobbles.
MADE GROUND: Brown gravelly f
sand. Gravel is fine to coarse angu
subrounded brick, concrete, asphal
limestone. With rare subangular bri
MADE GROUND: Brown gravelly s
fine to coarse, subrounded to round
quartzite with rare brick. With rare s
rounded flint and quartzite cobbles.
Soft black CLAY with old decaying to
rootlets.
Orange brown clayey gravelly fine fine to
SAND. Gravel is fine to coarse sub-
rounded flint and quartzite.
Soft to firm red brown sandy CLAY.
rare gravels of subangular very weat
SANDSTONE.
End of borehole at 4.00 m | e to coarse
ilar to
t, slate and
d rounded
ine to coarse
ar to
t, slate and
ck cobbles.
and. Gravel is
led flint and
ubrounded to
roots and
o coarse
angular to
At 4.0mbgl
ak
 |
| Rema
Refus | rks
al at 4.0 | 0mbgl. | | | | | | | |
| | | | | | | | | | Adu |

| | | | | | | | | | Borehole N | lo. | |
|----------|---|----------------------|----------|----------------------------|----------------------|----------------|----------|--|--|---------|--|
| | | | | | | Bo | reho | ole Log | WS02 | 2 | |
| | | | | | | | | | Sheet 1 of | 1 | |
| Projec | t Name | : Kent Stree | et, Birn | ningham | Project N
B063793 | o.
.002 | Co-ords: | : - | Hole Type
WS | е | |
| Locati | ion: | Land Nort | h of Ke | ent Street, Birmin | gham | | Level: | | Scale | | |
| <u> </u> | | | | - | | | | | 1:50 | W. | |
| Client | : | Camborne | Land | Investments | | | Dates: | 15/05/2017 - 15/05/2017 | ST | 'y
1 | |
| Well | Water
Strikes | Samples
Depth (m) | s and | In Situ Testing
Results | Dept
(m) | h Level
(m) | Legend | Stratum Description | 1 | | |
| Rema | rks | 0.50
1.20
1.20 | ES | N=35 (4,8/9,8,8,1 | 0) 1.50 | | | MADE GROUND: Brown silty grave
coarse SAND. Gravel is fine to coal
to subrounded brick, limestone, con
quartzite. With frequent angular to
brick and concrete cobbles. | elly fine to
rse, angular
ncrete and
subangular | | |
| Refus | Remarks
Refusal at 1.50mbgl unable to progress sampler. Hole collapse to 1m. | | | | | | | | | | |

| | | | | | | | | | Borehole N | lo. |
|----------------|------------------|--------------------------------------|-------------|---|---------------------------|--------------|----------|---|---|-----|
| | | | | | | Bo | reho | ole Log | WS03 | \$ |
| | | | | | | | | • | Sheet 1 of | 1 |
| Projec | ct Name: | : Kent Stree | et, Birn | ningham | Project No.
B063703.00 | פר | Co-ords: | - | Hole Type | e |
| | | l au al Marut | f 16 | | D0007 90.00 | 52 | 1 | | Scale | |
| Locati | ion: | Land Nort | n of Ke | ent Street, Birming | gnam | | Levei: | | 1:50 | |
| Client | : | Camborne | e Land | Investments | | | Dates: | 16/05/2017 - 16/05/2017 | Logged B
ST | y |
| Well | Water
Strikes | Samples | s and | In Situ Testing | Depth
(m) | Level
(m) | Legend | Stratum Description | I | |
| | | 0.50
1.20
2.00
2.00 | ES | N=26 (3,7/7,8,5,6
N=70 (4,10/70 fc
260mm) | 3)
1.40
r | | | MADE GROUND: Brown silty grave
coarse sand. Gravel is fine to coars
subrounded brick, concrete, limesto
quartzite.
MADE GROUND: Brown clayey gra
coarse sand. Gravel is fine to coars
subrounded brick, concrete, limesto
quartzite. | Ily fine to
e, angular to
ine and
ivelly fine to
e, angular to
ine and | 1 |
| | | 3.00
3.50
4.00
4.00
5.00 | ES
D | N=43 (6,8/20,11,7
N=44
(3,3/6,10,13,15) | 5.00 | | | Red brown clayey slightly gravelly f
medium SAND. Gravel is fine to coa
subanguair to rounded flint and qua | ine to
arse,
rtzite. | |
| Rema
Hole d | rks
collapse | to 4.00mbgl. | | | | | | | AGS | S |

| | | | | | | | | | Borehole N | lo. |
|---------------|-------------------|--------------|----------|--------------------------|-----------------------|-----------|----------|---------------------------------------|-----------------|------|
| | | | | | | Bo | reho | ole Log | WS04 | ŀ |
| | | | | | | | | | Sheet 1 of | 1 |
| Projec | ct Name: | Kent Stree | ∍t, Birn | ningham | Project No
B063793 | o.
002 | Co-ords: | : - | Hole Type
WS | Э |
| Loooti | ion: | Land Nort | h of Kr | ant Straat Dirmin | abom | 002 | Lovoli | | Scale | |
| Locau | ion: | Land Nort | | ent Street, Birmin | gnam | | Level: | | 1:50 | |
| Client | : | Camborne | Land | Investments | | | Dates: | 16/05/2017 - 16/05/2017 | Logged By
ST | У |
| Well | Water | Samples | s and | In Situ Testing | Depth | n Level | Legend | Stratum Description | 1 | |
| | Suikes | Depth (m) | Туре | Results | (11) | (11) | | MADE GROUND: Dark brown silty | aravellv fine | |
| | | 0.30 | ES | | | | | to coarse sand. Gravel is fine to coa | arse, angular | - |
| | | | | | | | | 0.40mbgl to 0.60mbgl rebar presen | t. | - |
| | | | | | | | | | | - |
| | | | | | | | | | | 1 - |
| | | 1.20 | | N=34
(11,11/10,10,8,6 |) | | | | | |
| | | | | | | | | | | - |
| | | | | | | | | | | - |
| | | 2.00
2.00 | D | 50 (3,3/50 for 0mi | m) 2.10 | | | End of borehole at 2.10 m | | 2 |
| | | | | | | | | | | - |
| | | | | | | | | | | - |
| | | | | | | | | | | 2 |
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| | | | | | | | | | | - |
| | | | | | | | | | | 10 - |
| Rema
Refus | irks
al at 2.1 | 0mbgl | | | | | | | AGS | 5 |

| | | | | | | | | | Borehole N | lo. |
|--------|------------------|--------------|----------|--------------------|--------------|--------------|----------|-------------------------|--|-----|
| | | | | | | Bo | reho | ole Log | WS05 | 5 |
| | | | | | | | | | Sheet 1 of | 1 |
| Projec | ct Name: | Kent Stree | et, Birn | ningham | Project No | 102 | Co-ords: | : - | Hole Type | |
| | | | | | | 102 | | | Scale | |
| Locati | ion: | Land Nort | h of Ke | ent Street, Birmin | gham | | Level: | | 1:50 | |
| Client | : | Camborne | e Land | Investments | | | Dates: | 16/05/2017 - 16/05/2017 | Logged B
ST | У |
| Well | Water
Strikes | Samples | s and | In Situ Testing | Depth
(m) | Level
(m) | Legend | Stratum Descriptior | 1 | |
| Well | Strikes | Depth (m) | Type | Results | 3) 1.40 | | Legend | Stratum Description | ally fine to
aded brick,
With frequent | |
| | | | | | | | | | | |
| Rema | rks | | | | | | | | | 10 |
| Refus | al at 1.4 | 0mbgl unable | to pro | ogress sampler. | | | | | AGS | 5 |

| | | | | | | | | | Borehole N | lo. |
|--------|------------------|--------------|----------|---------------------------|--------------|----------------|-------------|--|----------------------------|------|
| | | | | | | Bo | reho | ole Log | WS07 | , |
| | | | | | | | | | Sheet 1 of | 1 |
| Projec | t Name: | Kent Stree | ∍t, Birm | lingham | Project N | D.
002 | Co-ords: | - | Hole Type | |
| | | | | | 10003733. | 002 | | | Scale | |
| Locati | on: | Land North | n of Ke | int Street, Birmin | gham | | Level: | | 1:50 | |
| Client | : | Camborne | Land | Investments | | | Dates: | 22/05/2017 - 22/05/2017 | Logged B
ST | by |
| Well | Water
Strikes | Samples | s and I | n Situ Testing
Results | Depti
(m) | n Level
(m) | Legend | Stratum Descriptior | ı | |
| | | Doptin (ini) | 190 | | | | | MADE GROUND: Brown sandy gra | vel of fine to | - |
| | | | | | | | | coarse, angular to rounded brick, co
glass, flint and guartzite with freque | oncrete,
ent angular to | |
| | | 0.50 | ES | | | | | subangular brick and concrete cob | oles. | - |
| | | | | | | | | | | - |
| | | 4.00 | | | | | | | | 1 - |
| | | 1.20 | | N=4 (1,0/1,0,3,0 | ") | | | | | |
| | | | | | 1.50 | | | End of borehole at 1.50 m | | 1 - |
| | | | | | | | | | | - |
| | | | | | | | | | | 2 - |
| | | | | | | | | | | - |
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| | | | | | | | | | | 3 - |
| | | | | | | | | | | - |
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| | | | | | | | | | | - |
| | | | | | | | | | | 10 - |
| Rema | rks | | | <u> </u> | | | | | | |
| Refus | al at 1.5 | 0mbgl unable | to pro | gress sampler. C | Casing jam | on rods cau | sing hole c | collapse. | AGS | S |

| | | | | | | | | | Borehole No |). |
|--------|------------------|--|-----------------|---|--------------------------------|--------------|----------|---|--|----------------|
| | 6 | | | | | Bo | reho | ole Log | WS08 | |
| | | | | | Project No | | | | Sheet 1 of 1
Hole Type | |
| Projec | ct Name: | : Kent Stree | ∍t, Birm | ningham | B063793.00 |)2 | Co-ords: | - | WS | |
| Locati | ion: | Land Nort | h of Ke | ent Street, Birmin | gham | | Level: | | Scale | |
| | | | | | | | | 00/05/0047 00/05/0047 | Logged By | |
| Client | : | Camborne |) Land | Investments | | | Dates: | 22/05/2017 - 22/05/2017 | ST | |
| Well | Water
Strikes | Sample:
Depth (m) | s and I
Type | n Situ Testing
Results | Depth
(m) | Level
(m) | Legend | Stratum Descriptior | ı | |
| | | 0.50
1.20
1.20
2.00
2.40
3.00
4.00 | ES
D
D | N=50 (5,9/50 fo
240mm)
23 (3,3/23 for
165mm) | r 1.40
2.20
3.00
4.00 | | | MADE GROUND: Brown gravelly fi
sand. Gravel is fine to coarse, angu
rounded brick, concrete, limestone
With frequent angular to subangula
concrete cobbles.
MADE GROUND: Brown sandy gra
Gravel is fine t coarse, angular to sub
brick, concrete, quartzite, glass and
occasional subangular to subround
concrete cobbles.
Yellow mixed orange brown gravelly
coarse SAND.
Red brown slightly gravelly fine to n
SAND. Gravel if fine to coarse, sub
rounded flint and quartzite.
<u>End of borehole at 4.00 m</u> | ne to coarse
ilar to
and quartzite.
r brick and
velly clay.
ubrounded
I rebar. With
ed brick and
y fine to
nedium
rounded to | |
| Rema | rks | | | | | | | | 1 | -
-
10 — |
| Refus | al at 4.0 | 0mbgl. Collap | ose to 3 | 3.60mbgl. | | | | | AGS | |

| | | | | | | | | | Borehole N | lo. |
|--------|-----------|------------------------------|----------|--|---------------|------------|-------------|---|--|-----|
| | | | | | | Bo | reho | ole Log | WS10 |) |
| | | | | | | | | _ | Sheet 1 of | 1 |
| Projec | t Name: | Kent Stree | ∍t, Birm | ningham | Project No. | 12 | Co-ords: | - | Hole Type | |
| | | | | | |)2 | | | Scale | |
| Locati | on: | Land Nort | n of Ke | int Street, Birmin | gham | | Level: | | 1:50 | |
| Client | : | Camborne | Land | Investments | | 1 | Dates: | 22/05/2017 - 22/05/2017 | Logged B
ST | у |
| Well | Water | Samples | s and I | n Situ Testing | Depth | Level | Legend | Stratum Descriptior | 1 | |
| | Surkes | Depth (m) | Туре | Results | (11) | (11) | | MADE GROUND: Brown sandy gra | vel of fine to | |
| | | 0.50
1.20
1.20
2.00 | ES D | N=8 (1,2/2,2,1,3
50 (3,19/50 for
45mm) | 2.20 | | | MADE GROUND: Brown sandy gra
coarse, angular to rounded brick, co
limestone, rebar and glass. With fre
angular to subangular cobbles of co
brick. | vel of fine to
porcrete,
equent
oncrete and | |
| Pomo | rka | | | | | | | | | 9 |
| Refus | al at 2.2 | 0m. Unable to | ว progr | ess sampler. Ca | sing jam on r | ods casuir | ng hole col | lapse. | AGS | S |

| | | | | | | | | | Borehole N | 0. |
|--------|------------------|--------------------------------------|----------|--|-------------------------|--------------|----------|---|---|----|
| | 6 | | | | | Bo | reho | ole Log | WS11 | |
| | | | | | | | | | Sheet 1 of | 1 |
| Projec | ct Name | : Kent Stree | et, Birm | ningham | Project No
B063793 0 | 102 | Co-ords: | : - | Hole Type |) |
| | | N | | | | 02 | 1 | | Scale | |
| Locat | ion: | Land Nort | n of Ke | ent Street, Birmin | gnam | | Levei: | | 1:50 | |
| Client | : | Camborne | Land | Investments | | | Dates: | 22/05/2017 - 22/05/2017 | Logged By
ST | / |
| Well | Water
Strikes | Sample: | s and I | In Situ Testing | Depth
(m) | Level
(m) | Legend | Stratum Description | | |
| Rema | rks | 1.00
1.20
1.20
2.00
2.00 | ES
D | N=8 (1,2/2,2,1,3
50 (3,19/50 for
45mm) | 2.00 | | | MADE GROUND: Black grey sandy
fine to coarse, angular to rounded li
concrete, flint and quartzite.
MADE GROUND: Brown clayey gra
coarse sand. Gravel is fine to coars
rounded concrete, limestone, quart
rebar, wood and glass. With occasis
to subangular brick and concrete co
MADE GROUND: Firm red brown s
rare angular to subangular brick col
End of borehole at 2.00 m | r gravel of
mestone,
vel fine to
e, angular to
zite, brick,
onal angular
ibbles.
ilty clay. With
obles. | |
| Refus | al at 2.0 | 0mbgl. | | | | | | | AGS | |

| | | | | | | | | | Borehole N | lo. |
|--------|-----------------------|----------------------|---------------|----------------------------|---------------|--------------|----------|---|--|--------|
| | 6 | | | | | Bo | reho | ole Log | WS12 | 2 |
| | | | | | Due is at Nie | | | | Sheet 1 of | 1 |
| Proje | ct Name: | Kent Stree | et, Birn | ningham | B063793.0 |)02 | Co-ords: | - | WS | 3 |
| Locat | ion: | Land Nort | h of K | ant Street Dirmin | hom | | L ovel: | | Scale | |
| LUCAL | 1011. | | | | gilalli | | Level. | | 1:50 | |
| Client | : | Camborne | e Land | Investments | | | Dates: | 23/05/2017 - 23/05/2017 | Logged B | у
Т |
| Well | Water
Strikes | Samples
Depth (m) | s and
Type | In Situ Testing
Results | Depth
(m) | Level
(m) | Legend | Stratum Description | ı | |
| | | 0.50 | ES | N=31 (4,8/5,8,8,1 | 0) | | | MADE GROUND: Brown gravelly fi
sand. Gravel is fine to coarse, angu
rounded limestone, brick, concrete
With frequent angular to subangula
concrete cobbles. | ne to coarse
ilar to
and quartzite.
r brick and | 1 |
| | 0
0
0
0
0 | 2.00
2.00
2.20 | D
ES | N=32 (3,5/7,6,8,1 | 1) 2.00 | | | Yellow brown gravelly fine to mediu
Gravel is fine to coarse, subrounde
flint and quartzite. | m SAND.
d to rounded | 2 |
| | | 3.00 | | N=19 (3,6/5,4,4,6 | 3) | | | Red brown slightly gravelly fine to r
SAND. Gravel if fine to coarse, rour
quartzite. Bellow 4.0mbgl rare pock
micaceous material. | nedium
nded flint and
ets if | 3 |
| | 0
0 | 4.00
4.00 | D | 50 (20 for 0mm/50
0mm) | for
4.60 | | | End of borehole at 4.60 m | | 4 |
| Rema | rrks | | | | 4.60 | | | End of borehole at 4.60 m | | 5 |
| Refus | arks
al at 4.6 | 0m unable to | progre | ess sampler. Colla | apse to 4.1r | m. | | | AGS | 5 |

| | | | | | | | | | | Borehole N | lo. |
|-------------------|-----------------------|----------------------|-----------------|---------------------------|---------------|--------------------|--------------|-----------|--------------------------------------|-----------------------------|------|
| | | | | | Borehole Log | | | | | WS13/ | Α |
| | | | | | | | | | 0 | Sheet 1 of | 1 |
| Projec | t Name: | Kent Stree | et, Birm | ningham | Proje
B063 | ect No.
793.002 | 2 | Co-ords: | - | Hole Type
WS | е |
| Locati | on. | Land Nort | h of Ke | ent Street Birmin | aham | | | l evel: | | Scale | - |
| | 011. | Land Hort | | | gnam | | | 20101. | | 1:50 | |
| Client | : | Camborne | e Land | Investments | | | | Dates: | 23/05/2017 - 23/05/2017 | Logged B
ST | y |
| Well | Water
Strikes | Samples
Depth (m) | s and I
Type | n Situ Testing
Results | [| Depth
(m) | Level
(m) | Legend | Stratum Description | I | |
| | | 1 () | | | | | | | MADE GROUND: Black mixed brow | vn gravelly | - |
| | | | | | | | | | angular to rounded brick, concrete a | o coarse,
and quartzite. | - |
| | | | | | | | | | With rare angular to subangular cor | crete and | - |
| | | | | | | 0.85 | | | MADE COOLINE: Brick chetruction | | |
| | | | | | | | | | and broken through into void. | encountered | 1 - |
| | | | | | | 1.30 | | | End of borehole at 1.30 m | | |
| | | | | | | | | | | | - |
| | | | | | | | | | | | |
| | | | | | | | | | | | 2 - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | 3 - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | 4 - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | 5 - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | 6 - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | 7 - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | 8 - |
| | | | | | | | | | | | |
| | | | | | | | | | | | - |
| | | | | | | | | | | | - |
| | | | | | | | | | | | 9 - |
| | | | | | | | | | | | |
| | | | | | | | | | | | - |
| | | | | | | | | | | | |
| | | | | | | | | | | | 10 - |
| Rema | rks | | | 1 | | | I | 1 | | | |
| Brick 1
Hole t | floor enc
erminate | ountered at 0
ed. |).85mb | gl. Broken throug | gh to v | void. Are | ea cleaned | out and r | epaired. Possible old basement. | AGS | S |

| | | | | | | | | | Borehole N | lo. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Bo | reho | ole Log | WS13E | 3 |
| | | | | | - • • • • | | -1 | _ | Sheet 1 of | 1 |
| Projec | t Name: | Kent Stree | et, Birm | ningham | Project No.
B063793.00 | 2 | Co-ords: | - | Hole Type | 9 |
| Lest | | Lond Nort | h of Ko | ant Churcht Diamains | | 2 | Level | | Scale | |
| Locati | on: | Land Nort | n of Ke | ent Street, Birming | gnam | | Levei: | | 1:50 | |
| Client | : | Camborne | e Land | Investments | | T | Dates: | 23/05/2017 - 23/05/2017 | Logged By
ST | у
 |
| Well | Water
Strikes | Sample:
Depth (m) | s and I | n Situ Testing
Results | Depth
(m) | Level
(m) | Legend | Stratum Description | 1 | |
| | | 1 () | 51 | | | | | MADE GROUND: Brown gravelly fi | ne to coarse | |
| | | | | | | | | rounded brick, concrete and quartzi | ite. With | |
| | | 0.50 | ES | | | | | frequent angular to subangular bric
concrete cobbles. Bellow 1.00mbgl | k and
clayey | - |
| | | | | | | | | component present. | , , | - |
| | | 1 20 | | N=0 (1 0/0 0 0 0) | | | | | | 1 |
| | | 1.20 | D | 14-0 (1,0/0,0,0,0,0,0 | 4.50 | | | | | - |
| | | | | | 1.50 | | | Soft black CLAY with old decaying i
rootlets | roots and | |
| | | 2 00 | | N-28 (5 6/7 7 6 8 | 1.80 | | | Red brown fine to medium SAND. | | 2 |
| | | 2.00 | D | N-20 (3,0/7,7,0,0 | 2.20 | | | Pod brown fing to modium SAND | | |
| | | 2.00 | ES | | | | | Red brown line to medium SAND. | | _ |
| | 0 | | | | | | | | | - |
| | a | 3.00 | | N=19 (2.2/4.4.5.6 | | | | | | 3 — |
| | | | | - () -) -) -) - | , | | | | | - |
| | | | | | | | | | | - |
| | | | | | 0.05 | | | | | - |
| | | 3.85 | | 50 (9,12/50 for
270mm) | 3.85 | | | End of borehole at 4.00 m | | 4 — |
| | | 3.85 | D | | | | | | | - |
| | | | | | | | | | | _ |
| | | | | | | | | | | - |
| | | | | | | | | | | 5 - |
| | | | | | | | | | | - |
| | | | | | | | | | | - |
| | | | | | | | | | | - |
| | | | | | | | | | | 6 - |
| | | | | | | | | | | - |
| | | | | | | | | | | - |
| | | | | | | | | | | - |
| | | | | | | | | | | 7 - |
| | | | | | | | | | | - |
| | | | | | | | | | | - |
| | | | | | | | | | | - |
| | | | | | | | | | | 8 - |
| | | | | | | | | | | - |
| | | | | | | | | | | - |
| | | | | | | | | | | |
| | | | | | | | | | | 9 |
| | | | | | | | | | | - |
| | | | | | | | | | | - |
| | | | | | | | | | | 10 - |
| Rema | rks | | | | | | | | | |
| Collap | ose at 4. | 00m to 3.85m | ıbgl un | able to proceed. | Water strike | at 3.85mb | gl slow infl | ux. | AGS | 5 |
| | Si | GEC
ic barealigation | DC
are Ltd. | PR | E | | | | | | | A | GS | | Geo | ocore S | Site Investigations | 3 Ltd |
|----------------------|----------------------------|--------------------------------|-------------------|--------------------------|------------|--------------------------|--------------------------|--------|-------------------|-----------------|--------------|--------|---------|----------------------------|--|--------------------------|--|------------------------|
| Locati | ion | Kent S | Street | , Birmin | gham | | | | | | | | | | | | BOREHOLE | No |
| Job No
RT | o
7 /17/59 7 | 761 | | Date | 23-0 | 5-17 | | 0 | Grou | nd L | eve | l (m) | | Co-ord | linates () | | RBH01 | |
| Client | Curtin | is Cons | sultir | ng | | | | | | | | | | | | | Sheet
1 of 2 | |
| | | | | CORE | REC | COV | ER | Y 8 | ¢Τ | EST | S | | | | STRATA | | | |
| Drilling
Progress | Casing
depth/size | Water
level/
time/ | Flush
Return % | Depth (m)
AL/ from to | | Fotal core
Recovery % | Solid core
Recovery % | R.Q.D. | Fracture
Depth | racture
ndex | Tests | -egend | Reduced | Depth
(Thickness
(m) | C | Descrip | ition | nstrument/
3ackfill |
| | 0.8 | Uale | | | | | <u>DE</u> | Ľ | | | <u> </u> | | | (2.30) | MADE GROUND. Cobbles, red bri
reworked clay, rebar 0-2.3m. (Drille | ick, concr
er's descr | rete, slag, sandy
ription) | |
| | | | | | | | | | | | | | | 2.30 | Water Strike at 2.2m
SAND and GRAVEL. Sand is fine
to sub rounded quartz and sandsto | to coarse
ne. (Drill | Gravel is sub angular
ler's description) | |
| Rema
Rota | ARKS
ry Oper
ry Cori | nhole 0.0
ng (412) |) 12.0 |)m
-21.0m | | | | | | | | | | | | | | |
| All dime | ensions
cale 1:7 | in metr
1.0 | es | Client | t
S Tay | lor | | | | | | Eq | uipn | nent | Comacchio 205 | L | ogged By
D Greer | |

| | Sin | BEC
e barealignik | DC
one Lod. | RE | | | | | | | A | GS | | Geocore | Site Investigations I | Ltd |
|--------------------------------|-----------------------------|----------------------------------|-------------------|--------------------------|--------------------------|--------------------------|----------|---|--------------------------------|----------|---------------------------------------|----------|---------------------------------|--|---|-------------------------|
| Locat | ion | Kent S | Street | t. Birmingham | | | | | | | | | | | BOREHOLE N | lo |
| Job No | o
7/ 17/59 7 | 761 | | Date 23-0 | 5-17 | | (| Grou | nd L | eve | l (m) | | Co-orc | linates () | RBH01 | |
| Client | Curtin | s Con | sulti | ng | | | | | | | | | | | Sheet
2 of 2 | |
| | | | | CORE REC | COV | 'ER | Υð | & T. | EST | ſS | | | | STRATA | | |
| Drilling
Progress | Casing
depth/size | Water
level/
time/
date | Flush
Return % | Depth (m)
AL/ from to | Total core
Recoverv % | Solid core
Recovery % | R.Q.D. | Fracture
Depth | Fracture
Index | Tests | Legend | Reduced | Level
Level
C (Thickness) | Descri | ption | Instrument/
Backfill |
| | | | | - | | | | | | | | | (2.10) | Very weak reddish brown SANDSTONE. (| continued) | |
| | | | | 12.00-15.00 | 66.6 | 29 | 9 | 12.00
12.06
12.35 | NI
13.7
NI | | | - | 12.00
12.35
12.52 | SPT 12.0-12.45m 25/60mm,50/45mm
Medium strong reddish brown medium gra
SANDSTONE. Generally fresh. Complete
weathered/disintegrated neighbouring frac | ined arenaceous
ly
tures where recovered as | - |
| | | | | | | | | 12.52
12.62
12.72
12.89
13.34 | 30
NI
17.64
NI
7.5 | | | | | Ising medium sand. Fractures sub nonzonta
planar, rough and wide with up to 25mm si
Extremely weak reddish brown fine grainer
MUDSTONE. High sand content. Comple
Recovered as soft reddish brown very san
Extremely weak, locally weak in isolated co
medium grained arenaceous SANDSTON
weathered and recovered as reddish brow | Ity sand infill.
Ity sand infill.
a rajiliaceous
tely weathered.
dy clay.
ore stones, reddish brown
E. Generally completely
n silty medium sand with | |
| | | | | 15.00-18.00 | 50 | 7 | 0 | 14.00 | NR | | | | | occasional dark grey staining. Isolated co
moderate weathering where recovered.
12.52-12.89m - Fractures extremely closel
rough and open with dark reddish brown s
13.34-13.74m - Fractures sub horizontal v
planar, rough and wide with up to 25mm si | e stones exhibit
y spaced undulating,
ilty sand coatings.
ery closely spaced,
Ity sandy infill. | |
| | | | | | | | | 16.00 | 20 | | | | (5.48) | 16.00.16.10m Eracturae sub-barizontal v | | |
| | | | | | | | | 16.10 | NI | | | | | planar, rough and wide with up to 25mm si | ity sandy infill. | |
| | | | | 18.00-19.50 | 0 | 0 | 0 | 18.00 | NR | | · · · · · · · · · · · · · · · · · · · | - | 18.00 | No recovery. | | - |
| | | | | - | | | | | | | | - | (1.50) | | | |
| | | | | 19.50-21.00 | 33.3 | 1.3 | 0 | 19.50 | NI | | | | (1.00) | Extremely weak becoming medium strong
brown fine to medium grained arenaceous
Completely weathered becoming fresh at 2 | at 20.46m light reddish
SANDSTONE.
20.46m. | - |
| 00:00
2 00:00
2 23.05.17 | 12m | | | - | | | | 20.46
20.50 | 0
NR | | | - | 20.50 | No recovery. | | - |
| | | | | | | | | | | | | - | | | | |
| REMA
Rota
Rota | ARKS
ry Oper
ry Corii | nhole 0.
ng (412 | 0-12.0
) 12.0 | 0m
0-21.0m | 1 | 1 | <u> </u> | 1 | I | <u> </u> | <u> </u> | <u> </u> | | 1 | | 1 |
| All dim | ensions
cale 1:7 | in metr
1.0 | es | Client
S Tay | lor | | | | | | Equ | uipm | nent | Comacchio 205 | Logged By
D Greer | |

| | GEC
She bavestignah | DC
are Ed. | RRE | | | | | | | AC | ss
Z | | Geocore | Site Investigations | Ltd |
|--|-------------------------------|-------------------|--|---------------|------------|--------|-------------------|------------------|-------|--------|---------|----------------------------------|--|--|------------|
| Location | Kent S | Streef | . Birmingha | am | | | | | | | | | | BOREHOLE N | Jo |
| Job No
RT/17/59 | 9761 | | Date 17 | 7-05-17 | 7 | | Grou | ind L | .eve | l (m) | | Co-ordi | inates () | RBH02 | |
| Client
Curti | ns Cons | sulti | ng | | | | | | | | | | | Sheet
1 of 3 | |
| | | | CORE R | ECO | VEF | RY | & T | EST | ſS | | | | STRATA | | |
| Drilling
Progress
Casing
depth/size | Water
level/
time/ | ⁻lush
Return % | Depth (m)
AL/ from to | otal core | Solid core | R.Q.D. | Fracture
Depth | -racture
ndex | Tests | -egend | Reduced | Depth
(Thickness)
(m) | Descri | ption | nstrument/ |
| | | | | | | | | | | | | (4.50) | MADE GROUND. Red brick, cobbles, con
gravel with reworked clay. (Driller's descrip | crete, rebar, sand and
tion) | |
| | | | | | | | | | | | | (2.10)
6.60
(1.20)
7.80 | Water Strike 6.6m
Red/brown SAND with occasional pieces of description) | of gravel.(Driller's | |
| Remarks
Rotary Ope
Rotary Con | enhole 0.0 | 0-12.0 | 9.00-10.50
9.00-10.50
9.00-10.50
9.00-15.0 20.0-2 | 0.0m
25.0m | 0 0 | 0 | 9.00 | NI | | | | 9.00 | Red SANDSTONE. (Driller's description)
SPT 8.0-8.45m - 17,8/15mm,50/55mm
Extremely weak reddish brown medium co
SANDSTONE. Completely weathered. Re
brown silty medium sand. | arse grained arenaceous
acovered as reddish | |
| All dimension
Scale 1 | s in metr
64.5 | es | Client
S 7 | Tayloi | | | | | | Equ | ipme | ent | Comacchio 205 | Logged By
D Greer | |

| | Sit | GEC
e bavestigatis | DC
na Lid | | | | | | | | AGS | 5 | | Geocore | Site Investigations I | Ltd |
|----------------------|-----------------------------|----------------------------------|-------------------|------------------------------------|----------------|--------------------------|--------|-------------------------|-------------------|-------|-------------------|-------|--------------|---|--|-------------|
| Locati | ion | Kent S | Stree | t, Birmingham |] | | | | | | • | | | | BOREHOLE N | lo |
| Job No
RT | o
7 /17/59 7 | 761 | | Date 17-0 |)5-17
)5-17 | | (| Grou | nd L | eve | (m) | | Co-ordi | nates () | RBH02 | |
| Client | Curtin | s Cons | sulti | ng | | | | | | | | | | | Sheet
2 of 3 | |
| | | | | CORE REC | COV | /ER | Υð | & T | EST | ſS | | | | STRATA | | |
| Drilling
Progress | Casing
depth/size | Water
level/
time/
date | Flush
Return % | Depth (m)
AL/ from to | Total core | Solid core
Recovery % | R.Q.D. | Fracture
Depth | Fracture
Index | Tests | Legend
Reduced | Level | 0 (Thickness | Descri | ption | Instrument/ |
| | | | | 10.50-12.00 | 0 | 0 | 0 | 10.05 | NR | | | | 10.00 | Extremely weak reddish brown medium co
SANDSTONE. Completely weathered. Re
brown silty medium sand. (continued) | arse grained arenaceous
ecovered as reddish | |
| | | | | 12.00-13.50 | 0 | 0 | 0 | 12.00 | NR | | | | (6.00) | Water Strike 12.4m | | |
| | | | | 13.50-15.00 | 45 | 6 | 0 | 13.50
13.72
13.81 | NI
22.2
NI | | | | | 13.72-13.81m - Fractures sub horizontal, u
wide with slight dark grey discolouration on | Indulating rough and fracture surface. | |
| | | | | | | | | 14.18 | OH | | | | 15.00 | Red SANDSTONE. (Driller's description) | | _ |
| | | | | | | | | | | | | | (5.00) | | | |
| - | | | | - | | | | | | | | | 20.00 | | | |
| REMA
Rota
Rota | ARKS
ry Oper
ry Corii | nhole 0.0
ng (412) |)-12.
) 12.(| 0m & 15.0-20.0
)-15.0 20.0-25.0 | 0m
0m | | | | | | | | | | | |
| All dim
S | ensions
cale 1:6 | in metro
4.5 | es | Client
S Tay | ylor | | | | | | Equip | me | ent | Comacchio 205 | Logged By
D Greer | |

| | 57 | GEC
e bavesligatio | DC
are Ed. | | E | | | | | | | Ą | GS
✔ | | | Geocore | Site Investigations I | Ltd |
|----------------------|------------------------|----------------------------------|-------------------|--------------------------|------------------|--------------------------|--------------------------|--------|--|--------------------------|---------------|----------------------|---------|---------|--------------------|--|---|-------------------------|
| Locati | ion | Kent S | Street | t, Birming | ham | | | | | | | | | | | | BOREHOLE N | 10 |
| Job No
RT | o
7/ 17/59 7 | 761 | | Date | 17-05
18-05 | 5-17
5-17 | | (| Grou | ind L | eve | l (m) | | Co-o | ordi | inates () | RBH02 | |
| Client | Curtin | s Cons | sulti | ng | | | | | | | | | | | | | Sheet
3 of 3 | |
| | | | | CORE I | REC | OV | ER | Yð | &Т | EST | S | | | | _ | STRATA | | |
| Drilling
Progress | Casing
depth/size | Water
level/
time/
date | Flush
Return % | Depth (m)
AL/ from to | | Total core
Recovery % | Solid core
Recovery % | R.Q.D. | Fracture
Depth | Fracture
Index | Tests | Legend | Reduced | 2 Depth | (I hickness) (m) | Descri | ption | Instrument/
Backfill |
| | | | | 20.00-21 | .50 | 66.6 | 63 | 6.6 | 20.00 | 4.2 | | | | 20 | | Medium strong (locally weak) reddish brow
grained arenaceous SANDSTONE. Fresh | n medium to coarse | |
| | | | | | | 01 | | | 20.95
21.00 | NR
NR | | | | | | 20.95-21.63m - Fractures sub horizontal,
undulating, rough and moderately wide wit
discolouration on fracture surface. Multiple | closely spaced,
h a reddish brown
drill induced fractures. | |
| | | | | - 21.50-23 | .00 | 61 | 57 | 6.6 | 21.50
21.63
22.02
22.18
22.25
22.41 | 0
25
NI
0
NR | | | | (4.0 | 00) | 21.63-22.02m - Unfractured insitu.
22.02-22.18m - Fractures sub horizontal, v
undulating, rough and open with dark brov
fracture surface. | very closely spaced,
vn discolouration on | |
| | | | | 23.00-25 | .00 | 66.6 | 61.3 | 8 0 | 23.00 | 0 | | | | | | 23.00-23.67m - Unfractured insitu. Multipl
23.67-23.90m - Fractures sub horizontal,
undulating rough and moderately wide witt
discolouration. | e drill induced fractures.
very closely spaced,
n dark grey | |
| | 8 5 m | | | - | | | | | 23.90
24.00 | NI
NR | | | | (1.0 | . <u>00</u>
00) | No recovery. Drill loss. No evidence of vo | siding. | - |
| | 8.5m | | | | | | | | | | | | | | | | | |
| Rota
Rota | ry Oper
ry Cori | nhole 0.0
ng (412) | 0-12.0
) 12.0 | 0m & 15.0
0-15.0 20.0 | -20.01
-25.01 | m
m | | | | | | | | | | | | |
| All dim | ensions
cale 1:6 | | | | | | Equ | uipme | ent | | Comacchio 205 | Logged By
D Greer | | | | | | |

| | 6
57 | EEC
e bavesdigadiz | DC
ms Lid. | RR | Ε | | | | | | | A | ss
I | | Geocore | Site Investigation | s Ltd |
|----------------------|--------------------------|----------------------------------|-------------------|--------------------------|----------------|--------------------------|--------------------------|--------|-------------------|-------------------|-------|--------|---------|---|---|--|-------------------------|
| Locatio | n | Kent S | tree | t Birmin | mham | | | | | | | | | | | BOREHOLE | No |
| Job No
RT/ | 17/597 | 761 | | Date | 19-04
22-04 | 5-17
5-17 | | (| Grou | nd L | eve | l (m) | | Co-ordi | inates () | RBH03 | |
| Client | Curtin | s Cons | sulti | ng | | | | | | | | | | | | Sheet
1 of 2 | |
| | | | | CORE | REC | COV | ER | Y 8 | λ TI | EST | S | | | | STRATA | | |
| Drilling
Progress | Casing
depth/size | Water
level/
time/
date | Flush
Return % | Depth (m)
AL/ from to | | Total core
Recovery % | Solid core
Recovery % | R.Q.D. | Fracture
Depth | Fracture
Index | Tests | Legend | Reduced | O Depth
O (Thickness)
(m) | Descr | iption | Instrument/
Backfill |
| | RKS
y Oper
y Corin | date
hole 0.0
ng (412) |)-10.
) 10. | Om & 11
0-11.5m | 5-15.0 | <u>н « </u> | <u>or </u> | | | | | | | 0.00
(4.40)
(3.50)
7.90
(2.10)
10.00 | MADE GROUND. Concrete rebar cobbler
reworked clay. (Driller's description) | s, red brick, sand and gular to sub rounded scription) escription) | |
| All dime | nsions
ale 1:6 | in metro
4.5 | es | Client | s Tay | lor | | | | | | Equ | iipme | ent | Comacchio 205 | Logged By
D Greer | |

| | 6
57 | GEO
ic bavestigati: | DC
are Lid. | RR | E | | | | | | | A | GS | | | Geocore | Site Investigations I | Ltd |
|----------------------|----------------------|----------------------------------|-------------------|---------------------------|---------------|----------------------------|--------------------------|---------|------------|---|-------|--------|----------|------------------------------------|-------|--|--------------------------|-------------------------|
| Locat
Job N | ion
0 | Kent S | Street | , Birmin
Date | gham
19-08 | 5-17 | | (| Grou | nd L | eve | l (m) | - | Co-c | ordi | inates () | BOREHOLE N | 10 |
| Client | Curtin | 761
Is Cons | sulti | ng | 22-0 | 5-17 | | | | | | | | | | | Sheet 2 of 2 | |
| | | | | CORE | REC | OV | ER | Y & | ¢Τ | EST | S | | | | | STRATA | 1 | |
| Drilling
Progress | Casing
depth/size | Water
level/
time/
date | Flush
Return % | 00 Depth (m)
Depth (m) | 1.50 | ⊃ Total core
Recovery % | Solid core
Recovery % | ⊃R.Q.D. | B Fracture | Fracture Set Index Set Inde | Tests | Legend | Reduced | Level
10 Depth
0 (Thicknose) | 0 (m) | Descri | ption | Instrument/
Backfill |
| | | | | | | | - | | | | | | | (1.5 | 50) | | | |
| | | | | - | | | | | | | | | <u> </u> | 11. | .50 | Reddish/brown SANDSTONE, Verv weeka | nd constantly collapsing | - |
| | 10m | | | | | | | | | | | | | (3.5 | 50) | Reddish/brown SANDS I UNE. Very weeka
back into borehole. (Driller's description) | nd constantly collapsing | |
| | ARKS | | | | | | | | | | | | | 15. | | | | - |
| REMA
Rota
Rota | ry Oper
ry Corii | nhole 0.0
ng (412) | 0-10.0
) 10.0 | 0m & 11.
-11.5m | 5-15.0 | m | | | | | | | | | | | | |
| All dim | ensions
cale 1:6 | in metr
4.5 | es | Clien | t
S Tay | lor | | | | | | Eq | uipm | nent | | Comacchio 205 | Logged By
D Greer | |

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ic bavestigatio | DC
mer Lid. | R | E | | | | | | | A | GS | | Geocore | Site Investigations | s Ltd |
|----------------------|------------------------------------|----------------------------------|-------------------|--------------------------|----------------|--------------------------|--------------------------|--------|-------------------|-----------------|-------|--------|---------|-----------------------------|---|--|-------------------------|
| Locat | ion | Kent S | Street | . Birmin | aham | | | | | | | | | | | BOREHOLE | No |
| Job No | 0
7/ 17/59 7 | 761 | | Date | 18-08
19-08 | 5-17
5-17 | | (| Grou | nd L | eve | l (m) | | Co-ord | inates () | RBH04 | |
| Client | Curtin | s Con | sultir | ng | | | | | | | | | | | | Sheet
1 of 3 | |
| | | | | CORE | REC | OV | ER | Y 8 | ¢Τ | EST | S | | | | STRATA | | |
| Drilling
Progress | Casing
depth/size | Water
level/
time/
date | Flush
Return % | Depth (m)
AL/ from to | | Fotal core
Recovery % | Solid core
Recovery % | R.Q.D. | Fracture
Depth | racture
ndex | Tests | Legend | Reduced | Depth
(Thickness)
(m) | Descr | iption | Instrument/
Backfill |
| | 0.8 | uale | | | | | 012 | | | | | ××× | - | 0.00 | MADE GROUND. Tarmac. (Driller's descu
MADE GROUND. Red brick, concrete, sa | ription)
Ind and gravel. (Driller's | X |
| | | | | | | | | | | | | | | (1.90) | description) | | |
| | ARKS
ry Oper
ry Corin | hhole 0.
ng (412) | 0-13.0 | 0m
-25.5m | | | | | | | | | | 2.10 | Light brown SAND and GRAVEL. (Driller's | e description) | |
| All dim | ensions
cale 1:6 | in metr
64.5 | es | Client | t
S Tay | lor | | | | | | Equ | lipm | ent | Comacchio 405 | Logged By
R Taylor | |

| | Sin | GEC
e bavestigati | DC
ans Est. | RR | E | | | | | | | A | GS | | | Geocore | Site Investigations | Ltd |
|----------------------|-------------------------------|----------------------------------|-------------------|--------------------------|---------------------|--------------------------|--------------------------|--------|---|-------------------|-------|-------------------|--------------------------------------|-------|---------------------|--|---|-------------------------|
| Locat | ion | Kent S | Stree | t, Birming | gham | | | | | | | | | | | | BOREHOLE N | No |
| Job N
R | o
[/17/59 7 | 761 | | Date | -
18-05
19-05 | 5-17
5-17 | | (| Grou | nd L | eve | l (m) | | Co- | ordi | nates () | RBH04 | |
| Client | Curtin | s Con | sulti | ng | | | | | | | | | | | | | Sheet
2 of 3 | |
| | | | | CORE | REC | OV | ER | Υð | & T] | EST | S | | | | _ | STRATA | | |
| Drilling
Progress | Casing
depth/size | Water
level/
time/
date | Flush
Return % | Depth (m)
AL/ from to | | Total core
Recovery % | Solid core
Recovery % | R.Q.D. | Fracture
Depth | Fracture
Index | Tests | Legend | Reduced | Depth | O (m) | Descri | iption | Instrument/
Backfill |
| | | | | - | | | | | | | | 0.00 | - | 10 | 0.50 | Light brown SAND and GRAVEL. (Driller's | description) (continued) | |
| | | | | | | | | | | | | | | (2. | 50) | Light reddish brown SANDSTONE and mu
description) | udstone. (Driller's | |
| | | | | - 13.00-1 | 4.50 | 31.3 | 18 | 0 | <u>13.00</u>
13.10 | NI
22.2 | | · · · · · · · · · | - | 13 | 3.00 | SPT 13.0-13.45m - 15/50mm, remarked 5 | 0+/40mm | |
| | | | | - 14.50-1 | 7.50 | 25 | 10.6 | 0 | 13.19
13.32
13.47
13.47 | NI
20
NR | | | | (1. | 90) | Extremely weak slightly reddish brown me
arenaceous SANDSTONE. Completely w
light reddish brown silty coarse sand with t
core stones.
Fractures very closely spaced sub horizon
moderately wide with light brown silty coar | dium to coarse grained
eathered, recovered as
the exception of isolated
tal, undulating rough and
se sand infill. | |
| | | | | | | | | | 14.90 | 14.2
NR | | | - | 14 | 4.90 | Medium strong becoming weak with depth
reddish brown medium to coarse grained a
SANDSTONE. Generally moderately wea
weathered in non intact zones where reco
coarse sand. | (locally extremely weak)
arenaceous
thered. Completely
vered as silty medium to | |
| | | | | | | | | | | | | | | (3. | 28) | Fractures sub horizontal, very closely span
and moderately wide with dark orange bro
and reddish brown discolouration on the fr | zed, undulating, rough
wn sandy clay coatings
acture surface. | |
| | | | | - 17.50-2
 | 0.50 | 64 | 46.3 | 20 | 17.50
17.74
17.93
18.18
18.22 | NI
21
NI | | | -
-
-
-
-
-
-
- | 18 | <u>3.18</u>
3.32 | Weak thinly bedded firm reddish brown fin | e grained argillaceous | |
| | | | | - | | | | | 18.32 | 0 | | · · · · · · · · | - | 18 | 3.60 | MUDSTONE. Extremely high sand conter
Medium strong light reddish brown fine to
arenaceous SANDSTONE. Fresh. | nt. Highly weathered/
medium grained | /
Г |
| | | | | - | | | | | | | | | | (1. | 32) | Fractures dipping at 45°, closely spaced u
open with slightly reddish brown clayey co.
Medium strong reddish brown coarse graii
SANDSTONE. Fresh. Unfractured insitu. | ndulating, rough and atings.
ned arenaceous | |
| Rem/
Rota | ARKS
ary Oper
ary Corin | hole 0.
ng (412 | 0-13. | -
0m
0-25.5m | | | | | 19.92 | NR | | Fa | | | 9.92 | <u> </u> | Logged By | |
| S S | cale 1:6 | 4.5 | es | | S Tay | lor | | | | | | | | | | Comacchio 405 | R Taylor | |

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are Lid. | RR | E | | | | | | | A | GS | | | Geocore | Site Investigations L | Ltd |
|---|----------------------|-----------------------------|----------------------------------|-------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------|-------------------------|-------------------|-------|---------------------------------------|---|--|-----------------------------------|--|--|-------------------------|
| | Locati | on | Kent S | Stree | t, Birmir | igham | | | | | | | | | | | | BOREHOLE N | lo |
| J | lob No
RT |)
7/ 17/59 7 | 761 | | Date | 18-0
19-0 | 5-17
5-17 | | (| Grou | nd L | eve | l (m) | | C | Co-ordi | nates () | RBH04 | |
| | Client | Curtin | s Con | sulti | ng | | | | | | | | | • | | | | Sheet
3 of 3 | |
| | | | | | CORE | E REC | COV | 'ER | Υð | ¢Т | EST | S | | | | | STRATA | | |
| | Drilling
Progress | Casing
depth/size | Water
level/
time/
date | Flush
Return % | Depth (m)
AL/ from to | | Total core
Recoverv % | Solid core
Recovery % | R.Q.D. | Fracture
Depth | Fracture
Index | Tests | Legend | Reduced | Level | N Depth
O (Thickness)
O (m) | Descri | otion | Instrument/
Backfill |
| | | | | | | | | | | | | | | ÷ | | (0.58)
20.50 | No recovery (drill loss. No evidence of void | ling). <i>(continued)</i> | |
| | | | | | 20.50-2 | 23.50 | 80 | 73 | 37 | 20.50 | 6.66 | | · · · · · · · · · · · · · · · · · · · | | | | Medium strong, locally very weak reddish b
arenaceous SANDSTONE. Occasional int
quartz gravel. Generally fresh. Slight weal
neighbouring fractures. | rown medium grained
erbedded rounded
kening and disintegration | |
| | | | | | - | 21.21
21.21
21.71 | | | | | | | | | | | 20.50-21.25m - Fractures sub horizontal, v
undulating, rough and moderately wide with
sand coatings and slight dark grey discolou | ery closely spaced,
n reddish brown silty
iration. | |
| | | | | | | | 21.81 | 6.5 | | | | | | 21.25-21.77m - Fractures sub horizontal ve
planar, rough and open with slightl dark gre
fracture surface.
21.81-23.72m - Fractures sub horizontal ve | ery closely spaced
by discolouration on | | | | |
| | | | | | | | | | | 22.72
22.90 | 11.1
NR | | | | | (5.00) | planar, rough and open with slight dark gre
fracture surface. | y discolouration on | |
| | | | | | 23.50-2 | 25.50 | 73.5 | 37.5 | 0 | 23.50
23.60 | NI
11.6 | | | | | | 23.60-24.37m - Fractures sub horizontal, v
planar, rough and wide with up to 25mm sil | ery closely spaced,
ty sandy infill. | |
| | | | | | | | | | | 24.37 | NI | | | | | | | | |
| | 00:00 | | | | | | | | | 24.80
24.95
25.00 | 0
NR | | | | | | 24.8-24.95m - Unfractured insitu partially n drill process. | on intact/broken up by | |
| | 8.05.17 | 12m | | | - | | | | | | | | | <u> </u> | | 25.50 | | | |
| | | | | | - | | | | | | | | | | | | | | |
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I | | | | | |
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| | REMA
Rota
Rota | ARKS
ry Oper
ry Corii | nhole 0.
ng (412 | 0-13.
) 13.(| 0m
0-25.5m | | | | | | | | | | | | | | |
| | ll dime | ensions | in metr | es | Clier | nt
S Tar | lor | | | | | | Eq | uipm | ner | nt | Comacchio 405 | Logged By
R Taylor | |
| 5 | S | cale 1:6 | 4.5 | | | 5 18 | 101 | | | | | | | | | | | K Taylor | |

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A | | Geocore | Site Investigations | Ltd |
|--|---------------------------|-------------------|--------------------------|------------------|--|--------|-------------------|-----------------|--------------|--------|---------|-----------------------------|--------------------------------------|---------------------|-------------------------|
| Location | Kent St | reet. | Birmino | iham | | | | | | | | | | BOREHOLE N | No |
| Job No
RT/17/5 | 9761 | [| Date | 23-05-
24-05- | -17
-17 | | Grour | nd Le | evel | (m) | | Co-ordi | nates () | RBH05 | |
| Client | ins Consu | ulting | 3 | | | | | | | | | | | Sheet
1 of 3 | |
| | | (| CORE | REC | OVEF | RY | & TI | EST | ſS | | | | STRATA | | _ |
| Drilling
Progress
Casing
denth/size | Water
level/
time/ | Flush
Return % | Depth (m)
AL/ from to | | Fotal core
Recovery %
Solid core | R.Q.D. | Fracture
Depth | racture
ndex | Tests | Legend | Reduced | Depth
(Thickness)
(m) | Descri | ption | Instrument/
Backfill |
| | | | | | | | | | | | | (2.40) | steel rebar. (Driller's description) | description) | |
| REMARKS
Rotary Op
Rotary Co | enhole 0.0-
ring (412) | -12.0n
12.0-2 | n
27.0m
Client | | | | | | | | iipm | ent | | Logged By | |

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✔ | | | Geocore | Site Investigations I | Ltd |
|--|--|-------------------|--------------------------|--------------------------|--------------------------|--|-------------------|-------------------|-------|--------------|--|--|---|---------------|-----------------------|-------------------------|
| Location | Kent S | Street | , Birmingham | | | | | | | | | | | | BOREHOLE N | lo |
| Job No
RT/17/5 | 9761 | | Date 23-0
24-0 | 5-17
5-17 | | 0 | Grou | nd L | eve | l (m) | | Сс | o-ordi | nates () | RBH05 | |
| Client | ns Cons | sulti | ng | | | | | | | | | | | | Sheet
2 of 3 | |
| | | | CORE REC | COV | ER | Y 8 | λ Tl | EST | S | | | | | STRATA | | |
| Drilling
Progress
Casing
depth/size | Water
level/
time/
date | Flush
Return % | Depth (m)
AL/ from to | Total core
Recovery % | Solid core
Recovery % | R.Q.D. | Fracture
Depth | Fracture
Index | Tests | Legend | Reduced | Level | 0 (Thickness)
(m) | Descri | ption | Instrument/
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12.00
12.18
3.22)
15.40
3.20)
18.60
1.68) | Light orange SANDSTONE and mudstone.
SPT 12.0-12.65m - 16,9, remarked 50/20m
Very weak thinly interlaminated reddish bro
argillaceous MUDSTONE and sandstone.
completely weathered. Recovered as soft
icay where most intensely weathered. Frac
extremely closely spaced, undulating rough
merddish brown sandy clay coatings.
Extremely weak, becoming medium strong
medium to coarse grained arenaceous SAI
weathered, locally completely weathered w
redddish brown silty medium sand. Fresh 1
reduced to weak where most intensely wee
12.58-12.64m - 1 No. sub vertical fracture -
and moerately wide with dark reddish brow
12.69-12.92m - Fractures sub horizontal, v
undulating rough and wide with reddish bro
13.83-14.00m - Fractures sub horizontal, v
undulating rough and moderately wide with
discolouration on fracture surface.
Weak (locally extremely weak) reddish bro
grained argillaceous MUDSTONE. Extrer
Occasional blue grey reduction features.
Weak (locally extremely weak) reddish bro
grained argillaceous MUDSTONE. Extrer
Occasional blue grey reduction features.
15.65-15.75m - Fractures sub horizontal, v
undulating, rough and moderately wide with
sitrong.
16.63-16.46m - Fractures sub horizontal, v
undulating, rough and moderately wide with
infill.
16.35-16.65m - Fracture sub horizontal, ex-
planar rough and open with slight grey disc
surface.
18.24-18.55m - Fractures sub horizontal, ex-
planar rough and open with slight grey disc
surface.
18.24-18.55m - Fractures sub horizontal, v
undulating, smooth and open with up to 25
Medium strong reddish brown medium grai
SANDSTONE. Generally fresh. Notable | (Driller's description)
im
wm fine grained
Highly weathered to
reddish brown sandy
tures sub horizontal,
a and open with up to
at 13.3m, reddish brown
NDSTONE. Highly
here recovered as
13.3-15.0m. Strength
thered.
(80mm). Planar, rough
in discolouration.
ery closely spaced,
slight light grey
wm thinly bedded fine
nely high sand content.
Senerally completely
roducts. Intact core
ight rises to medium
ery closely spaced,
infill.
losely spaced,
infill.
losely spaced,
inght brown silty sand
tremely closely spaced,
inght brown silty sand
tremely closely spaced,
nolouration on fracture
ery closely spaced,
misity sandy infill.
ned arenaceous
isintegration
silty medium sand.
ery closely spaced,
mm silty sand infill. | | | |
| REMARKS
Rotary Op
Rotary Con | enhole 0.0
ing (412) |)-12.0
) 12.0 |)m
-27.0m | | | | | | | <u> ::::</u> | - | | | | | |
| All dimension
Scale 1 | s in metr
64.5 | es | Client
S Tay | lor | | | | | | Equ | iipm | ent | | Comacchio 405 | Logged By
R Taylor | |

| | Si | BEC
e bayestigatis |)(
na Lid. | RR | E | | | | | | | AG | is
Z | | Geocore | Site Investigations I | Ltd |
|---|----------------------|----------------------------------|----------------------|--------------------------|----------------|--------------------------|--------------------------|--------|--|----------------------------|-------|---------------------------------------|---------|--------------------------|--|---|-------------------------|
| Locati | on | Kent S | Stree | et. Birmin | aham | | | | | | | | | | | BOREHOLE N | lo |
| Job No
RT |)
/17/597 | /61 | | Date | 23-05
24-05 | 5-17
5-17 | | , | Grou | Ground Level (m) | | | | Co-orc | linates () | RBH05 | |
| Client | Curtin | s Cons | sulti | ing | | | | | | | | | | | | Sheet
3 of 3 | |
| CORE RECOVERY & TEST | | | | | | | EST | S | | | | STRATA | | | | | |
| Drilling
Progress | Casing
depth/size | Water
level/
time/
date | Flush
Return % | Depth (m)
AL/ from to | | Total core
Recoverv % | Solid core
Recovery % | R.Q.D. | Fracture
Depth | Fracture
Index | Tests | Legend | Reduced | Depth
0.0 (Thickness) | Descri | ption | Instrument/
Backfill |
| | | | | 21.00-2 | 24.00 | 90 | 71 | 29.6 | 20.21
20.28
20.50
6 21.00 | NI
4.5
NR
NI | | | | 20.28
(0.97)
21.25 | Strong (locally extremely weak) reddish bri
grained CONGLOMERATE. Rounded fine
held in reddish brown coarse sand matrix.
and broken up by drill process owing to po
vertical fracturing.
20.28-20.50m - 1 No. sub vertical fracture
rough and moderately wide with slight dark | own medium to coarse
to coarse quartz gravel
Moderately weathered
or consolidation and
(220mm). Undulating,
creddish brown | - |
| | | | | | | | | | 21.25
21.75
21.80
22.36
22.63 | 0
NI
5
NI
11.1 | | | | | discolouration.
Medium strong becoming strong with depticarse grained arenaceous SANDSTONE
moderately weathered 21.8-22.3m where weak.
21.80-22.30m - Fractures sub horizontal,
undulating, smooth and open with up to 25
22.36.20.82m Erectures user valore hores. | h light reddish brown .
Fresh. Locally
strength is reduced to
very closely spaced,
mm silty sand infill. | |
| | | | | | | | | | 23.70 | 9.09
3.4
NR | | | | (3.85) | 22.30-22.82m - Fractures very closely spa
undulating, rough and moderately wide wit
coatings. 22.82-23.70m - Fractures sub horizontal,
undulating rough and open with slight light | ced, sub norizontal,
h light brown silty sand
closely spaced,
grey reduction. | |
| | | | | - 24.00-2 | 27.00 | 87.6 | 70 | 29.6 | 24.00
24.00
24.05
24.74
24.85
25.10 | 0
NI
0
NI | | | | 25.10 | Medium strong (locally strong) reddish bro | wn medim to coarse | - |
| -
-
-
-
-
-
-
-
- | | | | | | | | | 25.43 | 7.69 | | | | (1.90) | grained arenaceous SANDS I ONE. Gene
weakening and disintegration on neighbou
25.43-26.08m - Fractures sub horizontal, o
undulating, smooth and moderately wide w
infill.
26.08-26.44m - Unfractured insitu. | rally fresh. Slight
ring fractures.
Josely spaced
ith up to 10mm silty sand | |
| -
- 00:00
-23.05.17 | 9m | | | - | | | | | 26.44
26.51
26.62 | NI
18.18
NR | | · · · · · · · · · · · · · · · · · · · | | 27.00 | 26.51-26.63m - Fractures sub horizontal, o
undulating, smooth and moderately wide v
infill. | closely spaced,
vith up to 10mm silty sand | |
| | RKS | | | | | | | | | | | | -
- | | | | |
| Rota
Rota | ry Oper
ry Corii | 1hole 0.0
1g (412) |)-12
) 12. | .0m
0-27.0m | | | | | | | | | | | | | |
| All dime
Se | ensions
cale 1:6 | in metr
4.5 | es | Clien | t
S Tay | lor | | | | | | Equi | pm | ent | Comacchio 405 | Logged By
R Taylor | |

GEOCORE ROTARY 59761.GPJ AGS3 ALL.GDT 2/6/17



SITE • INVESTIGATION FACTUAL REPORT

| CLIENT: | Curtins Consulting |
|-------------|---|
| ADDRESS: | Kent Street, Birmingham |
| CLIENT REF: | EBBI172 |
| OUR REF: | TP/17/60550 |
| | |
| | Tralee Close Kirkleatham Business Park Redcar Cleveland TS10 5SG
T 01642 481144 F 01642 498419 M 07778 019665 E geocore@geocore.co.uk W www.geocore.co.uk
Managing Director: Adam Woodhead MBA, BSc (Hons) FGS
Company Registration No. 4042825 VAT Registration No. 708 6835 09 |
| | |



| Ney | · 🔲 | -Riv Gully | O -Rivelipe | | | | |
|-----|---------------|--------------|------------------|-------------------|-----------|----------------|------------------|
| | =Roc | dding Eye 🗕 | →=Sur | veyed pipe indica | ting fall | > | =Unsurveyed pipe |
| | = <i>E/</i> / | H=Explorator | y Hole (hand dug | pit and/or window | / sample | | |
| E | উত্তি | =Hedge or S | Shrub | =Tree — | <u> </u> | =Boundary line | |
| | | | | | | | |

| GEOCORE
Site Investigations Ltd. | SITE AND | DRAINA | GE LAYOUT |
|-------------------------------------|-------------------------|-------------|------------------------|
| Site Crew: | John Thornton | Date: | 3rd & 4th January 2018 |
| Address: | Kent Street, Birmingham | | |
| Geocore Ref: | TP/17/60550 | Client Ref: | EBBI172 |

Kent Street



General Comments:

| Key. | | =RWGully | O =F | RWPipe | = 🛛 | FWGully | | =W//C (| or S/V pip | e 🗌 | | =Inspection | Chamber |
|------|---------|--------------|-----------|----------|---------|-------------|--------|---------|------------|-----------|-----|---------------|----------|
| | =Rod | dding Eye 🗕 | | ➡ =Surv | eyed p | ipe indicat | ing fa | a// | | | =Un | surveyed pipe | ; |
| | =E/ | H=Explorator | / Hole (h | hand dug | bit and | /or window | sam | ple | | | | | |
| ŝ | <u></u> | =Hedge or S | Shrub | રેંડે | =Tree | | | ••• | =Bound | lary line | | | |





TT01 terminated at 3.2m. Excavation remained open and dry on completion.





TT02 terminated at 3.4m due to round bricked ducting. Possible 6" water pipe.





TT03 terminated at 3.6m. Excavation remained open and dry on completion.



TT04 terminated at 4.1m. Excavation remained open and dry on completion.

| GEOCORE
Site Investigations Lad. | BOREH | BOREHOLE LOG RECORD | | | | | | | | | |
|-------------------------------------|-------------------------|---------------------|------------------------|--|--|--|--|--|--|--|--|
| Site Crew: | John Thornton | Date: | 3rd & 4th January 2018 | | | | | | | | |
| Address: | Kent Street, Birmingham | | | | | | | | | | |
| Geocore Ref: | TP/17/60550 | Client Ref: | EBBI172 | | | | | | | | |
| Borehole No: 5 | | | | | | | | | | | |

| | GEO
Sine breatly albeet | C P | RE | | | BOI | | OLE I | LOG | | Geocore S | Site Investigations Lt | d |
|----------------------------|----------------------------|-------------------------|---------------------|----------|------------------|--|----------------------------------|--------------------|------------------------|---------------------------------|-----------|---|--|
| Location | | | | | | | | | | | | BOREHOLE | No |
| Ker | nt Street, | Birming | sham | | | | | | | | | TT05 | |
| Job No | 100550 | Date | | 0 | Gro | ound Leve | el (m) | C | o-Ordinates () | | | 1100 | |
| Client | /60550 | | 04-01-1 | 8 | | | | | | | | Sheet | |
| Cur | tins | | | | | | | | | | | 1 of 1 | |
| SAMPI | ES & T | ESTS | | | | | | | STRATA | | | | nt/ |
| Depth | Type
No | R | Fest
esult | Water | Reduced
Level | Legend | Dep
(Thick- | th | Sildin | DESCRIPT | TION | 1 | nstrumer
Backfill |
| Bor
Date
Bor
Date | No
ing Prog
Time | R
Tress and
Depth | I Water Ol | Dia. | vations
mm | Jater Control of the second seco | (1.30)
(0.10)
0.
(1.30) | 40
Chise | DE GROUND
DE GROUND | Gravel har Brick and Water From | Added | e,
GENERAL
REMARKS
Trial pit terminated at
Lighting cable noted in
of pit. | Istimute and the second |
| All dimen | sions in me
le 1:8.75 | etres C1 | ient Enginee
Rob | r
Swi | nnerton | | Ma
Pla | ethod/
ant Used | 4 to | onne excavat | or | Logged By
J Thornton | |

| GEOCORE
Site Investigations Ltd. | BOREH | BOREHOLE LOG RECORD | | | | | | | | | |
|-------------------------------------|-------------------------|---------------------|------------------------|--|--|--|--|--|--|--|--|
| Site Crew: | John Thornton | Date: | 3rd & 4th January 2018 | | | | | | | | |
| Address: | Kent Street, Birmingham | | | | | | | | | | |
| Geocore Ref: | TP/17/60550 | Client Ref: | EBBI172 | | | | | | | | |
| Borehole No: 6 | | | | | | | | | | | |

| D | GEO
Sie berestigator | | RE | | | BO | REI | | e lo | G | | Geocore | Site Investigations Lt | d |
|------------------|----------------------------|-----------|---------------------|------------|------------------|------------------|---------------------|-------------------|------------|------------|--------------|---------|--|--------------------|
| Location | | | | | | | | | | | | | BOREHOLE | No |
| Ke | nt Street, | Birming | ham | | Car | Ground Louis (m) | | | | | | ТТ06 | | |
| JOD NO | 7/60550 | Date | 04-01-1 | 8 | Gro | und Lev | el (m) | | Co-Or | dinates () | | | | |
| Client | 1100550 | | 01011 | | | | | | | | | | Sheet | |
| Cu | rtins | | | | | | | | | | | | 1 of 1 | |
| SAMP | LES & TI | ESTS | | u. | | | | | S | TRATA | | | | lent/ |
| Depth | Type
No | T
Re | 'est
esult | Wate | Reduced
Level | Legend | D
(Thic
ness) | epth
k- | | | DESCRIPT | ION | | Instrum
Backfil |
| - | | | | | | | (0.1 | 0.10 | MADE G | ROUND. | Gravel har | ubble. | | - |
| _ | | | | | | | (0.2 | 0) | | | | | | |
| Во | ring Prog | ress and | Water Ol | oser | vations | | | Cl | niselling | ş | Water | Added | GENERAL | |
| Date | Time | Depth | Casi
Depth | ng
Dia. | mm | /ater
Dpt | Fro | m | То | Hours | From | То | REMARKS
Trial pit terminiated a
0.30m due to electricit
cable in the pit. | t
ty |
| All dimer
Sca | nsions in mo
le 1:1.875 | etres Cli | ent Engineer
Rob | Swi | nnerton | |] | Method
Plant U | l/
/sed | 4 to | nne excavato | pr | Logged By
J Thornton | |

| GEOCORE
Site Investigations Lat. | BOREH | BOREHOLE LOG RECORD | | | | | | | | | | |
|-------------------------------------|-------------------------|---------------------|------------------------|--|--|--|--|--|--|--|--|--|
| Site Crew: | John Thornton | Date: | 3rd & 4th January 2018 | | | | | | | | | |
| Address: | Kent Street, Birmingham | | | | | | | | | | | |
| Geocore Ref: | TP/17/60550 | Client Ref: | EBBI172 | | | | | | | | | |
| Borehole No: 7 | | | | | | | | | | | | |

| | GEO
Sine horeally altern | | RE | | | BO | REHO | DLE LC
SS
∡ |)G | | Geocore | Site Investigations Lt | d |
|------------------------------------|------------------------------------|----------|---------------------|----------|------------------|---------|--|-------------------|-------------|------------|--|-------------------------|---------------------|
| Location | | | | | | | | | | | | BOREHOLE | No |
| Kei | nt Street, | Birming | sham | | | | | | | | | TT07 | |
| Job No | 160550 | Date | 04 01 1 | 0 | Gro | und Lev | el (m) | Co-O | rdinates () | | | | |
| Client | /00330 | | 04-01-1 | 0 | | | | | | | | Sheet | |
| Cur | tins | | | | | | | | | | | 1 of 1 | |
| SAMPL | ES & TI | ESTS | | _ | | | | S | STRATA | | | | ent/ |
| Depth | Type
No | T
Re | Fest
esult | Wate | Reduced
Level | Legend | Depth
(Thick-
ness) | 1 | | DESCRIPT | TION | | Instrum
Backfill |
| _ | | | | | | | 0.10 | MADE C | GROUND. | Gravel har | dcore. | | |
| | | | Water O | | | | (2.90) | rebar. | BROUND | Concrete. | Addad | | |
| Date Time Depth Depth Casing Water | | | | | | ater | From | To | Hours | From | To | GENERAL
REMARKS | |
| | | | | | | | | | | | Trial pit terminated at
on concrete slab. | 3.0m | |
| All dimen
Scale | sions in me
1:19.375 | ctres Cl | ient Enginee
Rob | r
Swi | nnerton | | Method/
Plant Used 4 tonne excavator Logged By
J The | | | | | Logged By
J Thornton | |





Phase 2 Site Investigation

Appendix A3 – Chemical laboratory Testing Results

- Environmental Chemistry Analysis Results (Soil)
 - o Concept Life Sciences, Certificate No. 655797-1
 - o Concept Life Sciences, Certificate No. 656675-1
 - o Concept Life Sciences, Certificate No. 658265-1
 - o Concept Life Sciences, Certificate No. 659212-1
- Environmental Chemistry Analysis Results (Water)
 - o Concept Life Sciences, Certificate No. 662277-1



Concept Life Sciences is a trading name of Scientific Analysis Laboratories registered in England and Wales (No 2514788)

Concept Life Sciences

Certificate of Analysis

Hadfield House Hadfield Street Combrook Manchester M16 9FE Tel : 0161 874 2400 Fax : 0161 874 2468

Report Number: 655797-1

Date of Report: 06-Jun-2017

Customer: Curtins Consulting Ltd. 2 The Wharf Bridge Street Birmingham B1 2JS

Customer Contact: Mr Rob Swinnerton

Customer Job Reference: B063793.002/RS/8477 Customer Purchase Order: EBBi 78 Customer Site Reference: Kent Street, Birmingham Date Job Received at Concept: 22-May-2017 Date Analysis Started: 24-May-2017 Date Analysis Completed: 06-Jun-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation This report should not be reproduced except in full without the written approval of the laboratory Tests covered by this certificate were conducted in accordance with Concept SOPs







Report checked and authorised by : Bianca Prince Customer Service Manager Issued by : Bianca Prince Customer Service Manager

> Page 1 of 7 655797-1

Concept Reference: 655797 Project Site: Kent Street, Birmingham Customer Reference: B063793.002/RS/8477

Soil

| Soil | | Analysed | as Soil | | | | | | |
|-----------------|--------|----------------|----------|--------------|-------------|-------------|-------------|-------------|-------------|
| Heavy Metals(9) | | | | | | | | | |
| | | | Conce | ot Reference | 655797 001 | 655797 002 | 655797 003 | 655797 004 | 655797 005 |
| | | Custon | ner Samp | le Reference | WS01 | WS02/RC02 | WS03 | WS04 | WS05 |
| | | | | Depth | 1.70 | 0.50 | 0.50 | 0.30 | 0.50 |
| | | | D | ate Sampled | 15-MAY-2017 | 15-MAY-2017 | 16-MAY-2017 | 16-MAY-2017 | 16-MAY-2017 |
| | | | | Matrix Class | Sandy Soil |
| Determinand | Method | Test
Sample | LOD | Units | | | | | |
| Arsenic | T6 | M40 | 2 | mg/kg | 6 | 9 | 10 | 17 | 16 |
| Cadmium | T6 | M40 | 1 | mg/kg | <1 | 1 | <1 | 2 | 1 |
| Chromium | T6 | M40 | 1 | mg/kg | 14 | 17 | 20 | 19 | 28 |
| Copper | T6 | M40 | 1 | mg/kg | 110 | 380 | 160 | 940 | 320 |
| Lead | T6 | M40 | 1 | mg/kg | 100 | 150 | 260 | 710 | 210 |
| Mercury | T6 | M40 | 1 | mg/kg | 2 | <1 | <1 | <1 | <1 |
| Nickel | T6 | M40 | 1 | mg/kg | 16 | 13 | 18 | 42 | 22 |
| Selenium | T6 | M40 | 3 | mg/kg | <3 | <3 | <3 | <3 | <3 |
| Zinc | T6 | M40 | 1 | mg/kg | 79 | 430 | 390 | 720 | 520 |

Concept Reference: 655797 Project Site: Kent Street, Birmingham

Customer Reference: B063793.002/RS/8477

Analysed as Soil

Soil

Heavy Metals(9)

| | | | Conce | ot Reference | 655797 006 | 655797 007 | 655797 008 | 655797 009 | 655797 010 |
|-------------|--------|----------------|------------|--------------|-------------|-------------|-------------|-------------|---------------------|
| | | Custon | ner Sampl | le Reference | TP01 | TP02 | TP03 | TP05 | TP07 |
| | | 1.00 | | Depth | 2.00 | 0.30 | 0.50 | 0.30 | 0.10
18-MAY-2017 |
| | | | D | ate Sampled | 18-MAY-2017 | 18-MAY-2017 | 18-MAY-2017 | 18-MAY-2017 | |
| | | Matrix Class | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil | | |
| Determinand | Method | Test
Sample | LOD | Units | | 2015 | | | |
| Arsenic | Т6 | M40 | 2 | mg/kg | <2 | 7 | 23 | 8 | 7 |
| Cadmium | Т6 | M40 | 1 | mg/kg | <1 | <1 | 2 | <1 | <1 |
| Chromium | Т6 | M40 | 1 | mg/kg | 14 | 21 | 23 | 21 | 24 |
| Copper | Т6 | M40 | 1 | mg/kg | 19 | 78 | 690 | 150 | 71 |
| Lead | Т6 | M40 | 1 | mg/kg | 17 | 64 | 310 | 240 | 110 |
| Mercury | Т6 | M40 | 1 | mg/kg | <1 | <1 | 8 | <1 | <1 |
| Nickel | Т6 | M40 | 1 | mg/kg | 9 | 13 | 67 | 15 | 22 |
| Selenium | Т6 | M40 | 3 | mg/kg | <3 | <3 | <3 | <3 | <3 |
| Zinc | Т6 | M40 | 1 | mg/kg | 31 | 160 | 1800 | 250 | 190 |



Concept Reference: 655797 Project Site: Kent Street, Birmingham Customer Reference: B063793.002/RS/8477

Soil

Curtins Suite A

| | | | | | | - | | | |
|--------------------------------------|--------|----------------|-----------|--------------|-------------|-------------|-------------------------------|-------------|-------------|
| | | | Concep | ot Reference | 655797 001 | 655797 002 | 655797 003 | 655797 004 | 655797 005 |
| | | Custon | ner Sampl | le Reference | WS01 | WS02/RC02 | WS03 | WS04 | WS05 |
| | | | | Depth | 1.70 | 0.50 | 0.50 | 0.30 | 0.50 |
| | | | Di | ate Sampled | 15-MAY-2017 | 15-MAY-2017 | 16-MAY-2017 | 16-MAY-2017 | 16-MAY-2017 |
| | | | | Matrix Class | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil |
| Determinand | Method | Test
Sample | LOD | Units | | | | | |
| Asbestos ID | T27 | AR | | | N.D. | N.D. | Chrysotile Fibres
Detected | N.D. | N.D. |
| Boron (water-soluble) | Т6 | AR | 1 | mg/kg | 2 | <1 | <1 | <1 | <1 |
| Chromium VI | Т6 | AR | 1 | mg/kg | <1 | <1 | <1 | <1 | <1 |
| Cyanide(Total) | T546 | AR | 1 | mg/kg | <1 | <1 | <1 | <1 | <1 |
| рН | T7 | AR | | | 7.8 | 9.9 | 9.6 | 9.8 | 9.3 |
| Phenols(Mono) | T546 | AR | 1 | mg/kg | <1 | <1 | <1 | <1 | <1 |
| Retained on 10mm sieve | T2 | M40 | 0.1 | % | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Soil Organic Matter | T287 | A40 | 0.1 | % | 39 | 4.9 | 3.0 | 8.8 | 5.1 |
| (Water Soluble) SO4 expressed as SO4 | T242 | AR | 0.01 | g/l | 0.02 | 0.03 | 0.04 | 0.02 | 0.02 |

Concept Reference: 655797 Project Site: Kent Street, Birmingham Customer Reference: B063793.002/RS/8477

Soil Curtins Suite A Analysed as Soil

| | | | | | | | and the second se | | |
|--------------------------------------|--------|----------------|-----------|--------------|-------------|-------------|---|---------------------|-------------|
| | | | Concep | ot Reference | 655797 006 | 655797 007 | 655797 008 | 655797 009 | 655797 010 |
| | 1000 | Custon | ner Sampl | e Reference | TP01 | TP02 | TP03 | TP05 | TP07 |
| | 1000 | 20.10 | 1.22.78 | Depth | 2.00 | 0.30 | 0.50 | 0.30
18-MAY-2017 | 0.10 |
| | 0.15 | | Da | ate Sampled | 18-MAY-2017 | 18-MAY-2017 | 18-MAY-2017 | | 18-MAY-2017 |
| | | | | Matrix Class | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil |
| Determinand | Method | Test
Sample | LOD | Units | 15 . 2 | 1. | | | |
| Asbestos ID | T27 | AR | | | N.D. | N.D. | Chrysotile Fibres
Detected | N.D. | N.D. |
| Boron (water-soluble) | Т6 | AR | 1 | mg/kg | <1 | <1 | <1 | <1 | <1 |
| Chromium VI | Т6 | AR | 1 | mg/kg | <1 | <1 | <1 | <1 | <1 |
| Cyanide(Total) | T546 | AR | 1 | mg/kg | <1 | <1 | 45 | <1 | <1 |
| рН | T7 | AR | | 100 | 9.1 | 8.5 | 8.4 | 8.7 | 8.7 |
| Phenols(Mono) | T546 | AR | 1 | mg/kg | <1 | <1 | <1 | <1 | <1 |
| Retained on 10mm sieve | T2 | M40 | 0.1 | % | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Soil Organic Matter | T287 | A40 | 0.1 | % | 0.6 | 3.5 | 4.3 | 1.6 | 9.9 |
| (Water Soluble) SO4 expressed as SO4 | T242 | AR | 0.01 | g/l | <0.01 | <0.01 | 0.03 | 0.05 | <0.01 |



Concept Reference: 655797 Project Site: Kent Street, Birmingham Customer Reference: B063793.002/RS/8477

| Soil | | Analysed a | is Soil | | | | | | |
|-------------------------|--------|----------------|-----------|--------------|-------------------------|-----------------------|--------------------|-------------------------|-----------------------|
| TPH (CWG) | | / maryboa c | 000 | | | | | | |
| | | | | | | | | | |
| | | | Concep | t Reference | 655797 001 | 655797 002 | 655797 003 | 655797 004 | 655797 005 |
| | | Custon | ner Sampl | e Reference | WS01 | WS02/RC02 | WS03 | WS04 | WS05 |
| | | | | Depth | 1.70 | 0.50 | 0.50 | 0.30 | 0.50 |
| | | | Da | ate Sampled | 15-MAY-2017 | 15-MAY-2017 | 16-MAY-2017 | 16-MAY-2017 | 16-MAY-2017 |
| | | | 1 | Matrix Class | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil |
| Determinand | Method | Test
Sample | LOD | Units | | | | | |
| Benzene | T54 | AR | 1 | µg/kg | ^(110,13) <2 | ⁽¹³⁾ <1 | ⁽¹³⁾ <1 | ^(13,110) <2 | ⁽¹³⁾ <1 |
| Toluene | T54 | AR | 1 | µg/kg | ^(110,13) <2 | ⁽¹³⁾ <1 | ⁽¹³⁾ <1 | ^(13,110) <2 | ⁽¹³⁾ <1 |
| EthylBenzene | T54 | AR | 1 | µg/kg | 3 | <1 | <1 | ⁽¹¹⁰⁾ <2 | <1 |
| M/P Xylene | T54 | AR | 1 | µg/kg | 14 | 1 | <1 | ⁽¹¹⁰⁾ <2 | <1 |
| O Xylene | T54 | AR | 1 | µg/kg | 9 | <1 | <1 | ⁽¹¹⁰⁾ <2 | <1 |
| Methyl tert-Butyl Ether | T54 | AR | 1 | µg/kg | ⁽¹¹⁰⁾ <2 | <1 | <1 | ⁽¹¹⁰⁾ <2 | <1 |
| TPH (C5-C6 aliphatic) | T54 | AR | 0.010 | mg/kg | ⁽¹¹⁰⁾ <0.020 | <0.010 | <0.010 | ⁽¹¹⁰⁾ <0.020 | <0.010 |
| TPH (C6-C8 aliphatic) | T54 | AR | 0.010 | mg/kg | ⁽¹¹⁰⁾ <0.020 | <0.010 | <0.010 | ⁽¹¹⁰⁾ <0.020 | <0.010 |
| TPH (C8-C10 aliphatic) | T54 | AR | 0.010 | mg/kg | ⁽¹¹⁰⁾ <0.020 | <0.010 | <0.010 | ⁽¹¹⁰⁾ <0.020 | <0.010 |
| TPH (C10-C12 aliphatic) | T8 | AR | 1 | mg/kg | ^(9,13) <10 | ^(13,9) <10 | ⁽¹³⁾ <1 | ⁽¹³⁾ <1 | ^(9,13) <10 |
| TPH (C12-C16 aliphatic) | T8 | AR | 1 | mg/kg | ^(13,9) <10 | ^(13,9) <10 | ⁽¹³⁾ <1 | ⁽¹³⁾ <1 | ^(13,9) <10 |
| TPH (C16-C21 aliphatic) | T8 | AR | 1 | mg/kg | (13) 82 | ⁽¹³⁾ 12 | (13) 1 | ⁽¹³⁾ <1 | ^(13,9) <10 |
| TPH (C21-C35 aliphatic) | T8 | AR | 1 | mg/kg | ⁽¹³⁾ 200 | ⁽¹³⁾ 140 | (13) 3 | (13) 5 | ⁽¹³⁾ 45 |
| TPH (C6-C7 aromatic) | T54 | AR | 0.010 | mg/kg | (110) < 0.020 | <0.010 | <0.010 | (110) < 0.020 | <0.010 |
| TPH (C7-C8 aromatic) | T54 | AR | 0.010 | mg/kg | (110) <0.020 | <0.010 | <0.010 | ⁽¹¹⁰⁾ <0.020 | <0.010 |
| TPH (C8-C10 aromatic) | T54 | AR | 0.010 | mg/kg | 0.13 | <0.010 | <0.010 | ⁽¹¹⁰⁾ <0.020 | <0.010 |
| TPH (C10-C12 aromatic) | Т8 | AR | 1 | mg/kg | ⁽¹³⁾ 13 | ^(9,13) <10 | ⁽¹³⁾ <1 | ⁽¹³⁾ <1 | ^(13,9) <10 |
| TPH (C12-C16 aromatic) | T8 | AR | 1 | mg/kg | ⁽¹³⁾ 160 | ⁽¹³⁾ 27 | ⁽¹³⁾ 2 | ⁽¹³⁾ <1 | ⁽¹³⁾ 15 |
| TPH (C16-C21 aromatic) | Т8 | AR | 1 | mg/kg | ⁽¹³⁾ 140 | ⁽¹³⁾ 63 | ⁽¹³⁾ 10 | (13) 4 | (13) 87 |
| TPH (C21-C35 aromatic) | T8 | AR | 1 | mg/kg | ⁽¹³⁾ 110 | ⁽¹³⁾ 140 | ⁽¹³⁾ 28 | ⁽¹³⁾ 11 | (13) 400 |

Concept Reference: 655797 Project Site: Kent Street, Birmingham

Т8

Т8

Т8

TPH (C12-C16 aromatic)

TPH (C16-C21 aromatic)

TPH (C21-C35 aromatic)

AR

AR

AR

1

1

1

Soil

Customer Reference: B063793.002/RS/8477 Analysed as Soil TPH (CWG)

| | | | Conce | ot Reference | 655797 006 | 655797 007 | 655797 008 | 655797 009 | 655797 010 |
|-------------------------|--------|----------------|-----------|--------------|--------------------|-------------------------|-------------------------|-----------------------|-------------------------|
| | | Custor | ner Sampl | e Reference | TP01 | TP02 | TP03 | TP05 | TP07 |
| | | | | Depth | 2.00 | 0.30 | 0.50 | 0.30 | 0.10 |
| | | | Da | ate Sampled | 18-MAY-2017 | 18-MAY-2017 | 18-MAY-2017 | 18-MAY-2017 | 18-MAY-2017 |
| | | | | Matrix Class | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil |
| Determinand | Method | Test
Sample | LOD | Units | | | | | - |
| Benzene | T54 | AR | 1 | µg/kg | ⁽¹³⁾ <1 | (110,13) <2 | (13,110) <2 | ⁽¹³⁾ <1 | ^(13,110) <2 |
| Toluene | T54 | AR | 1 | µg/kg | ⁽¹³⁾ <1 | (110,13) <2 | (110,13) <2 | ⁽¹³⁾ <1 | (13,110) <2 |
| EthylBenzene | T54 | AR | 1 | µg/kg | <1 | ⁽¹¹⁰⁾ <2 | ⁽¹¹⁰⁾ <2 | <1 | ⁽¹¹⁰⁾ <2 |
| M/P Xylene | T54 | AR | 1 | µg/kg | <1 | ⁽¹¹⁰⁾ <2 | ⁽¹¹⁰⁾ <2 | <1 | ⁽¹¹⁰⁾ <2 |
| O Xylene | T54 | AR | 1 | µg/kg | <1 | (110) <2 | ⁽¹¹⁰⁾ <2 | <1 | ⁽¹¹⁰⁾ <2 |
| Methyl tert-Butyl Ether | T54 | AR | 1 | µg/kg | <1 | ⁽¹¹⁰⁾ <2 | ⁽¹¹⁰⁾ <2 | <1 | (110) <2 |
| TPH (C5-C6 aliphatic) | T54 | AR | 0.010 | mg/kg | <0.010 | ⁽¹¹⁰⁾ <0.020 | ⁽¹¹⁰⁾ <0.020 | <0.010 | ⁽¹¹⁰⁾ <0.020 |
| TPH (C6-C8 aliphatic) | T54 | AR | 0.010 | mg/kg | <0.010 | ⁽¹¹⁰⁾ <0.020 | ⁽¹¹⁰⁾ <0.020 | <0.010 | ⁽¹¹⁰⁾ <0.020 |
| TPH (C8-C10 aliphatic) | T54 | AR | 0.010 | mg/kg | <0.010 | ⁽¹¹⁰⁾ <0.020 | ⁽¹¹⁰⁾ <0.020 | <0.010 | ⁽¹¹⁰⁾ <0.020 |
| TPH (C10-C12 aliphatic) | Т8 | AR | 1 | mg/kg | ⁽¹³⁾ <1 | ^(9,13) <10 | ⁽¹³⁾ <1 | ^(9,13) <10 | ^(9,13) <10 |
| TPH (C12-C16 aliphatic) | Т8 | AR | 1 | mg/kg | ⁽¹³⁾ <1 | ⁽¹³⁾ 12 | ⁽¹³⁾ <1 | ^(9,13) <10 | ^(13,9) <10 |
| TPH (C16-C21 aliphatic) | Т8 | AR | 1 | mg/kg | ⁽¹³⁾ <1 | ⁽¹³⁾ 25 | ⁽¹³⁾ <1 | ⁽¹³⁾ 17 | ^(9,13) <10 |
| TPH (C21-C35 aliphatic) | Т8 | AR | 1 | mg/kg | ⁽¹³⁾ 1 | (13) 52 | ⁽¹³⁾ 2 | ⁽¹³⁾ 50 | ⁽¹³⁾ 25 |
| TPH (C6-C7 aromatic) | T54 | AR | 0.010 | mg/kg | <0.010 | (110) <0.020 | (110) <0.020 | <0.010 | ⁽¹¹⁰⁾ <0.020 |
| TPH (C7-C8 aromatic) | T54 | AR | 0.010 | mg/kg | <0.010 | ⁽¹¹⁰⁾ <0.020 | ⁽¹¹⁰⁾ <0.020 | <0.010 | ⁽¹¹⁰⁾ <0.020 |
| TPH (C8-C10 aromatic) | T54 | AR | 0.010 | mg/kg | <0.010 | ⁽¹¹⁰⁾ <0.020 | ⁽¹¹⁰⁾ <0.020 | <0.010 | ⁽¹¹⁰⁾ <0.020 |
| TPH (C10-C12 aromatic) | Т8 | AR | 1 | mg/kg | (13) <1 | ⁽¹³⁾ 280 | (13) <1 | ^(13,9) <10 | ^(9,13) <10 |
| | | | | | | | | | |

(13) <1

(13) <1

⁽¹³⁾ <1

⁽¹³⁾ 1600

(13) 4600

⁽¹³⁾ 4700

(13) 2

(13) 8

⁽¹³⁾ 20

 $^{(9,13)}$ <10

(13) 44

⁽¹³⁾ 160

⁽¹³⁾ 21

⁽¹³⁾ 130

⁽¹³⁾ 250

mg/kg

mg/kg

mg/kg

| Concept Reference:
Project Site: | | 655797 | | | | | | | |
|--|---|--|-------------------------------------|--------------|-------------|-------------|-------------|-------------|-------------|
| | | Kent Stree | et, Birming | ham | | | | | |
| Customer R | Customer Reference: B063793.002/RS/8477 | | | | | | | | |
| Soil | | Analysed | as Soil | | | | | | |
| MCERTS Preparation | | | | | | | | | |
| | | | Conce | pt Reference | 655797 001 | 655797 002 | 655797 003 | 655797 004 | 655797 005 |
| | | Custon | ner Samp | le Reference | WS01 | WS02/RC02 | WS03 | WS04 | WS05 |
| | | | | Depth | 1.70 | 0.50 | 0.50 | 0.30 | 0.50 |
| | | | D | ate Sampled | 15-MAY-2017 | 15-MAY-2017 | 16-MAY-2017 | 16-MAY-2017 | 16-MAY-2017 |
| | | | | Matrix Class | Sandy Soil |
| Determinand | Method | Test
Sample | LOD | Units | | | | | |
| Moisture @105C | T162 | AR | 0.1 | % | 72 | 15 | 12 | 13 | 11 |
| Concept R
Pro
Customer R
Soil
MCERTS Preparation | teference:
oject Site:
teference: | 655797
Kent Stree
B063793.
Analysed | et, Birming
002/RS/84
as Soil | gham
177 | | | | | |
| | | | Conce | pt Reference | 655797 006 | 655797 007 | 655797 008 | 655797 009 | 655797 010 |
| | | Custon | ner Samp | le Reference | TP01 | TP02 | TP03 | TP05 | TP07 |
| | | | | Depth | 2.00 | 0.30 | 0.50 | 0.30 | 0.10 |
| | | | D | ate Sampled | 18-MAY-2017 | 18-MAY-2017 | 18-MAY-2017 | 18-MAY-2017 | 18-MAY-2017 |
| | | | | Matrix Class | Sandy Soil |
| Determinand | Method | Test
Sample | LOD | Units | | 12. 11 | | 1.4.2 | |
| Moisture @105C | T162 | AR | 0.1 | % | 8.4 | 11 | 13 | 14 | 7.0 |
| Concert | oforonoo | 655707 | | | | | | | |

| Concept R | : 655797 | | | | | | | | | | | |
|-----------------------|------------|----------------|-------------|--------------|---------------------|---------------------|---------------------|-------------|---------------------|--|--|--|
| Project Site: | | Kent Stree | et, Birming | ham | | | | | | | | |
| Customer R | leference: | B063793.0 | 002/RS/84 | 77 | | | | | | | | |
| | | | 48.7 | | | | | | | | | |
| Soil | | Analysed a | as Soil | | | | | | | | | |
| PAH US EPA 16 (B and | K split) | | | | | | | | | | | |
| | | | Conce | pt Reference | 655797 001 | 655797 002 | 655797 003 | 655797 004 | 655797 005 | | | |
| | | Custor | ner Samp | le Reference | WS01 | WS02/RC02 | WS03 | WS04 | WS05 | | | |
| | | | | Depth | 1.70
15-MAY-2017 | 0.50 | 0.50 | 0.30 | 0.50 | | | |
| | | | D | ate Sampled | | 15-MAY-2017 | 16-MAY-2017 | 16-MAY-2017 | 16-MAY-2017 | | | |
| | | | | Matrix Class | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil | | | |
| Determinand | Method | Test
Sample | LOD | Units | | - A. | | | | | | |
| Naphthalene | T207 | M105 | 0.1 | mg/kg | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 | <0.1 | ⁽⁹⁾ <1.0 | | | |
| Acenaphthylene | T207 | M105 | 0.1 | mg/kg | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 | <0.1 | ⁽⁹⁾ <1.0 | | | |
| Acenaphthene | T207 | M105 | 0.1 | mg/kg | 2.4 | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 | <0.1 | ⁽⁹⁾ <1.0 | | | |
| Fluorene | T207 | M105 | 0.1 | mg/kg | 1.2 | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 | <0.1 | ⁽⁹⁾ <1.0 | | | |
| Phenanthrene | T207 | M105 | 0.1 | mg/kg | 5.0 | ⁽⁹⁾ <1.0 | 6.0 | 1.6 | 1.9 | | | |
| Anthracene | T207 | M105 | 0.1 | mg/kg | 1.8 | ⁽⁹⁾ <1.0 | 2.0 | 0.5 | ⁽⁹⁾ <1.0 | | | |
| Fluoranthene | T207 | M105 | 0.1 | mg/kg | 15 | 1.0 | 7.6 | 3.7 | 4.1 | | | |
| Pyrene | T207 | M105 | 0.1 | mg/kg | 15 | ⁽⁹⁾ <1.0 | 6.4 | 3.3 | 3.6 | | | |
| Benzo(a)Anthracene | T207 | M105 | 0.1 | mg/kg | 4.2 | ⁽⁹⁾ <1.0 | 3.1 | 1.9 | 2.1 | | | |
| Chrysene | T207 | M105 | 0.1 | mg/kg | 5.1 | ⁽⁹⁾ <1.0 | 2.7 | 2.3 | 2.0 | | | |
| Benzo(b)fluoranthene | T207 | M105 | 0.1 | mg/kg | 3.9 | ⁽⁹⁾ <1.0 | 2.0 | 2.1 | 1.9 | | | |
| Benzo(k)fluoranthene | T207 | M105 | 0.1 | mg/kg | 2.9 | ⁽⁹⁾ <1.0 | 2.8 | 2.2 | 2.4 | | | |
| Benzo(a)Pyrene | T207 | M105 | 0.1 | mg/kg | 3.5 | ⁽⁹⁾ <1.0 | 2.7 | 2.3 | 2.3 | | | |
| Indeno(123-cd)Pyrene | T207 | M105 | 0.1 | mg/kg | 1.7 | ⁽⁹⁾ <1.0 | 1.5 | 1.3 | 1.4 | | | |
| Dibenzo(ah)Anthracene | T207 | M105 | 0.1 | mg/kg | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 | 0.6 | ⁽⁹⁾ <1.0 | | | |
| Benzo(ghi)Perylene | T207 | M105 | 0.1 | mg/kg | 2.1 | ⁽⁹⁾ <1.0 | 1.7 | 1.2 | 1.5 | | | |
| PAH(total) | T207 | M105 | 0.1 | mg/kg | 64 | 1.0 | 39 | 23 | 23 | | | |

Concept Reference: 655797 Project Site: Kent Street, Birmingham Customer Reference: B063793.002/RS/8477

Analysed as Soil

PAH US EPA 16 (B and K split)

Soil

| PAR US EPA 16 (B and P | (split) | | | | | | | | |
|------------------------|----------|----------------|-----------|--------------|-------------|---------------------|-------------|---------------------|---------------------|
| | | | Concep | t Reference | 655797 006 | 655797 007 | 655797 008 | 655797 009 | 655797 010 |
| | | Custon | ner Sampl | e Reference | TP01 | TP02 | TP03 | TP05 | TP07 |
| | | | | Depth | 2.00 | 0.30 | 0.50 | 0.30 | 0.10 |
| | | | Da | ate Sampled | 18-MAY-2017 | 18-MAY-2017 | 18-MAY-2017 | 18-MAY-2017 | 18-MAY-2017 |
| | | | I | Matrix Class | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil |
| Determinand | Method | Test
Sample | LOD | Units | | | | | |
| Naphthalene | T207 | M105 | 0.1 | mg/kg | <0.1 | ⁽⁹⁾ <1.0 | <0.1 | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 |
| Acenaphthylene | T207 | M105 | 0.1 | mg/kg | <0.1 | ⁽⁹⁾ <1.0 | <0.1 | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 |
| Acenaphthene | T207 | M105 | 0.1 | mg/kg | <0.1 | ⁽⁹⁾ <1.0 | <0.1 | ⁽⁹⁾ <1.0 | 1.2 |
| Fluorene | T207 | M105 | 0.1 | mg/kg | <0.1 | ⁽⁹⁾ <1.0 | <0.1 | ⁽⁹⁾ <1.0 | 1.0 |
| Phenanthrene | T207 | M105 | 0.1 | mg/kg | <0.1 | ⁽⁹⁾ <1.0 | 0.3 | ⁽⁹⁾ <1.0 | 9.8 |
| Anthracene | T207 | M105 | 0.1 | mg/kg | <0.1 | ⁽⁹⁾ <1.0 | <0.1 | ⁽⁹⁾ <1.0 | 3.0 |
| Fluoranthene | T207 | M105 | 0.1 | mg/kg | <0.1 | 1.4 | 0.8 | ⁽⁹⁾ <1.0 | 20 |
| Pyrene | T207 | M105 | 0.1 | mg/kg | <0.1 | 1.3 | 0.8 | ⁽⁹⁾ <1.0 | 17 |
| Benzo(a)Anthracene | T207 | M105 | 0.1 | mg/kg | <0.1 | ⁽⁹⁾ <1.0 | 0.4 | ⁽⁹⁾ <1.0 | 8.7 |
| Chrysene | T207 | M105 | 0.1 | mg/kg | <0.1 | ⁽⁹⁾ <1.0 | 0.4 | ⁽⁹⁾ <1.0 | 8.3 |
| Benzo(b)fluoranthene | T207 | M105 | 0.1 | mg/kg | <0.1 | 1.0 | 0.4 | ⁽⁹⁾ <1.0 | 8.6 |
| Benzo(k)fluoranthene | T207 | M105 | 0.1 | mg/kg | <0.1 | 1.4 | 0.4 | ⁽⁹⁾ <1.0 | 7.4 |
| Benzo(a)Pyrene | T207 | M105 | 0.1 | mg/kg | <0.1 | 1.2 | 0.5 | ⁽⁹⁾ <1.0 | 9.1 |
| Indeno(123-cd)Pyrene | T207 | M105 | 0.1 | mg/kg | <0.1 | ⁽⁹⁾ <1.0 | 0.3 | ⁽⁹⁾ <1.0 | 6.3 |
| Dibenzo(ah)Anthracene | T207 | M105 | 0.1 | mg/kg | <0.1 | ⁽⁹⁾ <1.0 | 0.1 | ⁽⁹⁾ <1.0 | 2.9 |
| Benzo(ghi)Perylene | T207 | M105 | 0.1 | mg/kg | <0.1 | ⁽⁹⁾ <1.0 | 0.3 | ⁽⁹⁾ <1.0 | 6.2 |
| PAH(total) | T207 | M105 | 0.1 | mg/kg | <0.1 | 6.3 | 4.8 | <1.0 | 110 |

Index to symbols used in 655797-1

| Value | Description |
|-------|--|
| M40 | Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis. |
| AR | As Received |
| A40 | Assisted dried < 40C |
| M105 | Analysis conducted on an "as received" aliquot.
Results are reported on a dry weight basis where
moisture content was determined by assisted drying of
sample at 105C |
| N.D. | Not Detected |
| 110 | LOD raised due to low internal standard recovery. |
| 9 | LOD raised due to dilution of sample |
| 13 | Results have been blank corrected. |
| S | Analysis was subcontracted |
| М | Analysis is MCERTS accredited |
| U | Analysis is UKAS accredited |
| N | Analysis is not UKAS accredited |

Notes

| Cyanide was analysed at Concept Life Sciences Braintree |
|--|
| These samples have been analysed exceeding recommended holding times for Cyanide. It is possible therefore that the results provided may be compromised. |
| Asbestos was subcontracted to REC Asbestos. |

Method Index

| Value | Description |
|-------|-------------------------------------|
| T27 | PLM |
| T162 | Grav (1 Dec) (105 C) |
| Т6 | ICP/OES |
| Т8 | GC/FID |
| T207 | GC/MS (MCERTS) |
| T54 | GC/MS (Headspace) |
| T2 | Grav |
| T7 | Probe |
| T242 | 2:1 Extraction/ICP/OES (TRL 447 T1) |

| T287 | Calc TOC/0.58 |
|------|------------------|
| T546 | Colorimetry (CF) |

Accreditation Summary

| Determinand | Method | Test
Sample | LOD | Units | Symbol | Concept References |
|--------------------------------------|--------|----------------|-------|-------|--------|--------------------|
| Moisture @105C | T162 | AR | 0.1 | % | N | 001-010 |
| Asbestos ID | T27 | AR | | | SU | 001-010 |
| Boron (water-soluble) | Т6 | AR | 1 | mg/kg | N | 001-010 |
| Chromium VI | T6 | AR | 1 | mg/kg | N | 001-010 |
| Cyanide(Total) | T546 | AR | 1 | mg/kg | М | 001-010 |
| pH | T7 | AR | | | М | 001-010 |
| Phenols(Mono) | T546 | AR | 1 | mg/kg | М | 001-010 |
| Retained on 10mm sieve | T2 | M40 | 0.1 | % | N | 001-010 |
| Soil Organic Matter | T287 | A40 | 0.1 | % | N | 001-010 |
| (Water Soluble) SO4 expressed as SO4 | T242 | AR | 0.01 | g/l | N | 001-010 |
| Benzene | T54 | AR | 1 | µg/kg | U | 001-010 |
| Toluene | T54 | AR | 1 | µg/kg | U | 001-010 |
| EthylBenzene | T54 | AR | 1 | µg/kg | U | 001-010 |
| M/P Xylene | T54 | AR | 1 | µg/kg | U | 001-010 |
| O Xylene | T54 | AR | 1 | µg/kg | U | 001-010 |
| Methyl tert-Butyl Ether | T54 | AR | 1 | µg/kg | U | 001-010 |
| TPH (C5-C6 aliphatic) | T54 | AR | 0.010 | mg/kg | N | 001-010 |
| TPH (C6-C8 aliphatic) | T54 | AR | 0.010 | mg/kg | N | 001-010 |
| TPH (C8-C10 aliphatic) | T54 | AR | 0.010 | mg/kg | N | 001-010 |
| TPH (C10-C12 aliphatic) | Т8 | AR | 1 | mg/kg | N | 001-010 |
| TPH (C12-C16 aliphatic) | Т8 | AR | 1 | mg/kg | N | 001-010 |
| TPH (C16-C21 aliphatic) | Т8 | AR | 1 | mg/kg | N | 001-010 |
| TPH (C21-C35 aliphatic) | Т8 | AR | 1 | mg/kg | N | 001-010 |
| TPH (C6-C7 aromatic) | T54 | AR | 0.010 | mg/kg | N | 001-010 |
| TPH (C7-C8 aromatic) | T54 | AR | 0.010 | mg/kg | N | 001-010 |
| TPH (C8-C10 aromatic) | T54 | AR | 0.010 | mg/kg | N | 001-010 |
| TPH (C10-C12 aromatic) | Т8 | AR | 1 | mg/kg | N | 001-010 |
| TPH (C12-C16 aromatic) | Т8 | AR | 1 | mg/kg | N | 001-010 |
| TPH (C16-C21 aromatic) | Т8 | AR | 1 | mg/kg | N | 001-010 |
| TPH (C21-C35 aromatic) | Т8 | AR | 1 | mg/kg | N | 001-010 |
| Arsenic | Т6 | M40 | 2 | mg/kg | М | 001-010 |
| Cadmium | T6 | M40 | 1 | mg/kg | М | 001-010 |
| Chromium | T6 | M40 | 1 | mg/kg | М | 001-010 |
| Copper | T6 | M40 | 1 | mg/kg | М | 001-010 |
| Lead | T6 | M40 | 1 | mg/kg | М | 001-010 |
| Mercury | T6 | M40 | 1 | mg/kg | М | 001-010 |
| Nickel | T6 | M40 | 1 | mg/kg | М | 001-010 |
| Selenium | T6 | M40 | 3 | mg/kg | М | 001-010 |
| Zinc | T6 | M40 | 1 | mg/kg | М | 001-010 |
| Naphthalene | T207 | M105 | 0.1 | mg/kg | М | 001-010 |
| Acenaphthylene | T207 | M105 | 0.1 | mg/kg | U | 001-010 |
| Acenaphthene | T207 | M105 | 0.1 | mg/kg | М | 001-010 |
| Fluorene | T207 | M105 | 0.1 | mg/kg | М | 001-010 |
| Phenanthrene | T207 | M105 | 0.1 | mg/kg | M | 001-010 |
| Anthracene | T207 | M105 | 0.1 | mg/kg | U | 001-010 |
| Fluoranthene | T207 | M105 | 0.1 | mg/kg | M | 001-010 |
| Pyrene | T207 | M105 | 0.1 | mg/kg | М | 001-010 |
| Benzo(a)Anthracene | T207 | M105 | 0.1 | mg/kg | М | 001-010 |
| Chrysene | T207 | M105 | 0.1 | mg/kg | M | 001-010 |
| Benzo(b)fluoranthene | T207 | M105 | 0.1 | mg/kg | M | 001-010 |
| Benzo(k)fluoranthene | T207 | M105 | 0.1 | mg/kg | M | 001-010 |
| Benzo(a)Pyrene | T207 | M105 | 0.1 | mg/kg | М | 001-010 |
| Indeno(123-cd)Pyrene | T207 | M105 | 0.1 | mg/kg | M | 001-010 |
| Dibenzo(ah)Anthracene | T207 | M105 | 0.1 | mg/kg | М | 001-010 |
| Benzo(ghi)Perylene | T207 | M105 | 0.1 | mg/kg | M | 001-010 |
| PAH(total) | T207 | M105 | 0.1 | mg/kg | U | 001-010 |



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Concept Life Sciences

Certificate of Analysis

Hadfield House Hadfield Street Combrook Manchester M16 9FE Tel : 0161 874 2400 Fax : 0161 874 2468

Report Number: 656675-1

Date of Report: 07-Jun-2017

Customer: Curtins Consulting Ltd. 2 The Wharf Bridge Street Birmingham B1 2JS

Customer Contact: Mr Rob Allen

Customer Job Reference: B063793.002/ST/8479 Customer Site Reference: Kent Street, Birmingham Additional Date Job Received at Concept: 25-May-2017 Date Analysis Started: 30-May-2017 Date Analysis Completed: 07-Jun-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept SOPs







Report checked and authorised by : Bianca Prince Customer Service Manager Issued by : Bianca Prince Customer Service Manager

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Concept Reference: 656675 Project Site: Kent Street, Birmingham Additional Customer Reference: B063793.002/ST/8479

Analysed as Soil

Soil

Heavy Metals(9) **Concept Reference** 656675 003 656675 004 656675 005 656675 006 656675 007 Customer Sample Reference **TP06 TP08** WS11 WS10 WS07 Depth 0.50 0.50 1.00 0.50 0.30 Date Sampled 19-MAY-2017 19-MAY-2017 22-MAY-2017 22-MAY-2017 22-MAY-2017 Matrix Class Sandy Soil Sandy Soil Sandy Soil Sandy Soil Sandy Soil Test Sample Determinand Method LOD Units Arsenic Т6 M40 2 mg/kg 34 11 7 8 8 T6 M40 Cadmium 1 mg/kg 2 <1 <1 <1 <1 Chromium Т6 M40 1 mg/kg 28 63 33 23 52 T6 M40 1 650 Copper mg/kg 95 96 190 70 Lead Т6 M40 370 750 71 1 100 120 mg/kg Т6 Mercury M40 1 mg/kg 3 <1 <1 <1 <1 Т6 Nickel M40 1 49 19 29 16 25 mg/kg Selenium Т6 M40 3 mg/kg <3 <3 <3 <3 <3 Т6 M40 1 1200 400 210 320 120 Zinc mg/kg

| Concept Reference: | 656675 |
|---------------------|------------------------------------|
| Project Site: | Kent Street, Birmingham Additional |
| Customer Reference: | B063793.002/ST/8479 |
| | |

| Soil | | Analysed | as Soil | | | | |
|-----------------|--------|----------------|-----------|--------------|-------------|-------------|-------------|
| Heavy Metals(9) | | | | | | | |
| | | 1.20 | Concep | ot Reference | 656675 008 | 656675 010 | 656675 011 |
| | | Custon | ner Sampl | e Reference | WS08 | WS13 | RC05 |
| | | 1.00 | | Depth | 2.40 | 2.00 | 3.00 |
| | | | Da | ate Sampled | 22-MAY-2017 | 23-MAY-2017 | 22-MAY-2017 |
| | | 1.45 | | Matrix Class | Sandy Soil | Sandy Soil | Sandy Soil |
| Determinand | Method | Test
Sample | LOD | Units | | 2015 | |
| Arsenic | Т6 | M40 | 2 | mg/kg | 3 | 4 | 3 |
| Cadmium | Т6 | M40 | 1 | mg/kg | <1 | <1 | <1 |
| Chromium | Т6 | M40 | 1 | mg/kg | 8 | 16 | 10 |
| Copper | Т6 | M40 | 1 | mg/kg | 5 | 4 | 20 |
| Lead | Т6 | M40 | 1 | mg/kg | 6 | 3 | 45 |
| Mercury | Т6 | M40 | 1 | mg/kg | <1 | <1 | <1 |
| Nickel | Т6 | M40 | 1 | mg/kg | 5 | 11 | 10 |
| Selenium | T6 | M40 | 3 | mg/kg | <3 | <3 | <3 |
| Zinc | Т6 | M40 | 1 | mg/kg | 16 | 24 | 44 |



Concept Reference: 656675 Project Site: Kent Street, Birmingham Additional Customer Reference: B063793.002/ST/8479

Analysed as Soil

Soil

Curtins Suite A

| | | | Conce | pt Reference | 656675 003 | 656675 004 | 656675 005 | 656675 006 | 656675 007 |
|--------------------------------------|--------|----------------|--------------|--------------|-------------|-------------------------------|-------------|-------------|-------------|
| | | Custon | ner Samp | le Reference | TP06 | TP08 | WS11 | WS10 | WS07 |
| | | | | Depth | 0.50 | 0.50 | 1.00 | 0.50 | 0.30 |
| | | | D | ate Sampled | 19-MAY-2017 | 19-MAY-2017 | 22-MAY-2017 | 22-MAY-2017 | 22-MAY-2017 |
| | | | Matrix Class | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil | |
| Determinand | Method | Test
Sample | LOD | Units | | | | | |
| Asbestos ID | T27 | AR | | | N.D. | Chrysotile Fibres
Detected | N.D. | N.D. | N.D. |
| Boron (water-soluble) | Т6 | AR | 1 | mg/kg | <1 | <1 | <1 | <1 | <1 |
| Chromium VI | Т6 | AR | 1 | mg/kg | <1 | <1 | <1 | <1 | <1 |
| Cyanide(Total) | T546 | AR | 1 | mg/kg | <1 | 2 | <1 | <1 | <1 |
| рН | T7 | AR | | | 7.7 | 7.8 | 8.4 | 9.1 | 8.7 |
| Phenols(Mono) | T546 | AR | 1 | mg/kg | <1 | <1 | <1 | <1 | <1 |
| Retained on 10mm sieve | T2 | M40 | 0.1 | % | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Soil Organic Matter | T287 | A40 | 0.1 | % | 13 | 5.5 | 1.7 | 2.9 | 2.5 |
| (Water Soluble) SO4 expressed as SO4 | T242 | AR | 0.01 | g/l | <0.01 | 0.10 | 0.10 | 0.06 | 0.01 |

Concept Reference: 656675 Project Site: Kent Street, Birmingham Additional Customer Reference: B063793.002/ST/8479

Soil Curtins Suite B Analysed as Soil

| | Concept Reference | | | | | | | | |
|--------------------------------------|-------------------|----------------|-----------|--------------|--------------------|--------------------|--------------------|--|--|
| | | Custon | ner Sampl | e Reference | WS08 | WS13 | RC05 | | |
| | | 22.12 | | Depth | 2.40 | 2.00 | 3.00 | | |
| | 0.35 | | D | ate Sampled | 22-MAY-2017 | 23-MAY-2017 | 22-MAY-2017 | | |
| | | | | Matrix Class | Sandy Soil | Sandy Soil | Sandy Soil | | |
| Determinand | Method | Test
Sample | LOD | Units | 2.5 | 20 St | | | |
| Boron (water-soluble) | T6 | AR | 1 | mg/kg | <1 | <1 | <1 | | |
| Chromium VI | T6 | AR | 1 | mg/kg | <1 | <1 | <1 | | |
| Cyanide(Total) | T546 | AR | 1 | mg/kg | <1 | <1 | <1 | | |
| pН | T7 | AR | | | 7.9 | 7.4 | 8.1 | | |
| Phenols(Mono) | T546 | AR | 1 | mg/kg | <1 | <1 | <1 | | |
| Retained on 10mm sieve | T2 | M40 | 0.1 | % | <0.1 | <0.1 | <0.1 | | |
| Soil Organic Matter | T287 | A40 | 0.1 | % | 0.1 | <0.1 | 0.7 | | |
| (Water Soluble) SO4 expressed as SO4 | T242 | AR | 0.01 | g/l | <0.01 | <0.01 | <0.01 | | |
| TPH (C8-C10) | Т8 | M105 | 1 | mg/kg | ⁽¹³⁾ <1 | ⁽¹³⁾ <1 | ⁽¹³⁾ <1 | | |
| TPH (C10-C12) | T206 | M105 | 1 | mg/kg | ⁽¹³⁾ <1 | ⁽¹³⁾ <1 | (13) <1 | | |
| TPH (C12-C16) | T206 | M105 | 1 | mg/kg | ⁽¹³⁾ <1 | ⁽¹³⁾ <1 | ⁽¹³⁾ 1 | | |
| TPH (C16-C21) | T206 | M105 | 1 | mg/kg | (13) <1 | (13) <1 | ⁽¹³⁾ 11 | | |
| TPH (C21-C35) | T206 | M105 | 1 | mg/kg | ⁽¹³⁾ <1 | (13) <1 | (13) 450 | | |

Concept Reference: 656675 Project Site: Kent Street, Birmingham Additional Customer Reference: B063793.002/ST/8479

| Soil
TPH (CWG) | | Analysed a | as Soil | | | | | | |
|-------------------------|--------|----------------|-----------|--------------|-------------------------|-------------------------|-----------------------|-----------------------|-----------------------|
| 111(6116) | | | | | | | | | |
| | | | Concep | ot Reference | 656675 003 | 656675 004 | 656675 005 | 656675 006 | 656675 007 |
| | | Custor | ner Sampl | e Reference | TP06 | TP08 | WS11 | WS10 | WS07 |
| | | | | Depth | 0.50 | 0.50 | 1.00 | 0.50 | 0.30 |
| - | | | Da | ate Sampled | 19-MAY-2017 | 19-MAY-2017 | 22-MAY-2017 | 22-MAY-2017 | 22-MAY-2017 |
| | | | | Matrix Class | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil |
| Determinand | Method | Test
Sample | LOD | Units | | | | | |
| Benzene | T54 | AR | 1 | µg/kg | ^(110,13) <2 | ^(13,110) <2 | ⁽¹³⁾ <1 | ⁽¹³⁾ <1 | ⁽¹³⁾ <1 |
| Toluene | T54 | AR | 1 | µg/kg | ^(13,110) <2 | ^(13,110) <2 | ⁽¹³⁾ <1 | ⁽¹³⁾ <1 | ⁽¹³⁾ <1 |
| EthylBenzene | T54 | AR | 1 | µg/kg | ⁽¹¹⁰⁾ <2 | ⁽¹¹⁰⁾ <2 | <1 | <1 | <1 |
| M/P Xylene | T54 | AR | 1 | µg/kg | ⁽¹¹⁰⁾ <2 | ⁽¹¹⁰⁾ <2 | <1 | <1 | <1 |
| O Xylene | T54 | AR | 1 | µg/kg | ⁽¹¹⁰⁾ <2 | ⁽¹¹⁰⁾ <2 | <1 | <1 | <1 |
| Methyl tert-Butyl Ether | T54 | AR | 1 | µg/kg | ⁽¹¹⁰⁾ <2 | ⁽¹¹⁰⁾ <2 | <1 | <1 | <1 |
| TPH (C5-C6 aliphatic) | T54 | AR | 0.010 | mg/kg | (110) <0.020 | (110) <0.020 | <0.010 | <0.010 | <0.010 |
| TPH (C6-C8 aliphatic) | T54 | AR | 0.010 | mg/kg | ⁽¹¹⁰⁾ <0.020 | ⁽¹¹⁰⁾ <0.020 | <0.010 | <0.010 | <0.010 |
| TPH (C8-C10 aliphatic) | T54 | AR | 0.010 | mg/kg | ⁽¹¹⁰⁾ <0.020 | ⁽¹¹⁰⁾ <0.020 | <0.010 | <0.010 | <0.010 |
| TPH (C10-C12 aliphatic) | Т8 | M105 | 1 | mg/kg | ^(9,13) <10 | ^(9,13) <10 | ^(13,9) <10 | ^(13,9) <10 | ^(9,13) <10 |
| TPH (C12-C16 aliphatic) | Т8 | M105 | 1 | mg/kg | ^(13,9) <10 | ^(9,13) <10 | ^(9,13) <10 | ^(9,13) <10 | ^(13,9) <10 |
| TPH (C16-C21 aliphatic) | Т8 | M105 | 1 | mg/kg | ^(9,13) <10 | ^(9,13) <10 | ^(13,9) <10 | ^(13,9) <10 | ^(13,9) <10 |
| TPH (C21-C35 aliphatic) | Т8 | M105 | 1 | mg/kg | ^(9,13) <10 | ⁽¹³⁾ 13 | ^(13,9) <10 | ^(9,13) <10 | ⁽¹³⁾ 10 |
| TPH (C6-C7 aromatic) | T54 | AR | 0.010 | mg/kg | (110) < 0.020 | (110) < 0.020 | <0.010 | <0.010 | <0.010 |
| TPH (C7-C8 aromatic) | T54 | AR | 0.010 | mg/kg | (110) < 0.020 | (110) < 0.020 | <0.010 | <0.010 | <0.010 |
| TPH (C8-C10 aromatic) | T54 | AR | 0.010 | mg/kg | (110) < 0.020 | (110) < 0.020 | <0.010 | <0.010 | <0.010 |
| TPH (C10-C12 aromatic) | Т8 | M105 | 1 | mg/kg | ^(9,13) <10 | ^(9,13) <10 | ^(9,13) <10 | ^(13,9) <10 | ^(9,13) <10 |
| TPH (C12-C16 aromatic) | Т8 | M105 | 1 | mg/kg | ^(9,13) <10 | ^(13,9) <10 | ^(9,13) <10 | ^(9,13) <10 | ^(9,13) <10 |
| TPH (C16-C21 aromatic) | T8 | M105 | 1 | mg/kg | (13) 25 | (13) 28 | ⁽¹³⁾ 16 | (13) 14 | ⁽¹³⁾ 12 |
| TPH (C21-C35 aromatic) | Т8 | M105 | 1 | ma/ka | (13) 78 | (13) 70 | (13) 51 | (13) 13 | (13) 23 |

| | Concept Re | ference: | 656675 | | | | C. P. S. S. S. | | | Contraction of the | | | | |
|------------|-------------|------------|----------------|------------------------------------|--------------|-------------|----------------|-------------|-------------|--------------------|--|--|--|--|
| | Pro | iect Site: | Kent Stree | Kent Street, Birmingham Additional | | | | | | | | | | |
| | Customer Re | eference: | B063793. | 002/ST/8- | 479 | | | | | | | | | |
| Soil | | | Analysed | as Soil | | | | | | | | | | |
| ICERTS | Preparation | | | | | | | | | | | | | |
| | | | | Conce | pt Reference | 656675 003 | 656675 004 | 656675 005 | 656675 006 | 656675 007 | | | | |
| | | | Custon | ner Samp | le Reference | TP06 | TP08 | WS11 | WS10 | WS07 | | | | |
| | | | | | Depth | 0.50 | 0.50 | 1.00 | 0.50 | 0.30 | | | | |
| | | | | 0 | ate Sampled | 19-MAY-2017 | 19-MAY-2017 | 22-MAY-2017 | 22-MAY-2017 | 22-MAY-2017 | | | | |
| | | | | | Matrix Class | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil | Sandy Soil | | | | |
| Dete | erminand | Method | Test
Sample | LOD | Units | | | | | | | | | |
| Moisture (| @105C | T162 | AR | 0.1 | % | 9.8 | 5.5 | 17 | 9.8 | 8.9 | | | | |

| Concept | Reference: | 656675 | | | | | | | | | |
|--------------------|--|----------------|------------------------------------|-------------|-------------|-------------|-------------|--|--|--|--|
| Pi | oject Site: | Kent Stre | Kent Street, Birmingham Additional | | | | | | | | |
| Customer | Reference: | B063793. | 3063793.002/ST/8479 | | | | | | | | |
| Soil | | Analysed | as Soil | | | | | | | | |
| MCERTS Preparation | MCERTS Preparation | | | | | | | | | | |
| | Concept Reference 656675 008 656675 010 656675 0 | | | | | | | | | | |
| | Customer Sample Reference | | | | | | RC05 | | | | |
| | | | | Depth | 2.40 | 2.00 | 3.00 | | | | |
| | | | Da | ate Sampled | 22-MAY-2017 | 23-MAY-2017 | 22-MAY-2017 | | | | |
| Matrix Class S | | | | | | Sandy Soil | Sandy Soil | | | | |
| Determinand | Method | Test
Sample | LOD | Units | | | | | | | |
| Moisture @105C | T162 | AR | 0.1 | % | 7.8 | 9.4 | 16 | | | | |
Concept Reference: 656675 Project Site: Kent Street, Birmingham Additional Customer Reference: B063793.002/ST/8479

Soil

Analysed as Soil PAH US EPA 16 (B and K split)

| | | | Concep | ot Reference | 656675 003 | 656675 004 | 656675 005 | 656675 006 | 656675 007 |
|-----------------------|--------|----------------|-----------|--------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | | Custon | ner Sampl | e Reference | TP06 | TP08 | WS11 | WS10 | WS07 |
| | | | | Depth | 0.50 | 0.50 | 1.00 | 0.50 | 0.30 |
| | | | Da | ate Sampled | 19-MAY-2017 | 19-MAY-2017 | 22-MAY-2017 | 22-MAY-2017 | 22-MAY-2017 |
| | | | I | Matrix Class | Sandy Soil |
| Determinand | Method | Test
Sample | LOD | Units | | | | | |
| Naphthalene | T207 | M105 | 0.1 | mg/kg | 1.2 | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 |
| Acenaphthylene | T207 | M105 | 0.1 | mg/kg | ⁽⁹⁾ <1.0 |
| Acenaphthene | T207 | M105 | 0.1 | mg/kg | 3.0 | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 |
| Fluorene | T207 | M105 | 0.1 | mg/kg | 2.1 | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 | ⁽⁹⁾ <1.0 |
| Phenanthrene | T207 | M105 | 0.1 | mg/kg | 16 | ⁽⁹⁾ <1.0 | 9.8 | ⁽⁹⁾ <1.0 | 10 |
| Anthracene | T207 | M105 | 0.1 | mg/kg | 5.3 | ⁽⁹⁾ <1.0 | 2.4 | ⁽⁹⁾ <1.0 | 3.5 |
| Fluoranthene | T207 | M105 | 0.1 | mg/kg | 22 | 1.0 | 16 | 1.7 | 13 |
| Pyrene | T207 | M105 | 0.1 | mg/kg | 21 | ⁽⁹⁾ <1.0 | 13 | 1.7 | 10 |
| Benzo(a)Anthracene | T207 | M105 | 0.1 | mg/kg | 10 | ⁽⁹⁾ <1.0 | 4.9 | ⁽⁹⁾ <1.0 | 4.4 |
| Chrysene | T207 | M105 | 0.1 | mg/kg | 11 | ⁽⁹⁾ <1.0 | 5.4 | 1.2 | 4.7 |
| Benzo(b)fluoranthene | T207 | M105 | 0.1 | mg/kg | 11 | ⁽⁹⁾ <1.0 | 3.6 | 1.2 | 2.7 |
| Benzo(k)fluoranthene | T207 | M105 | 0.1 | mg/kg | 11 | ⁽⁹⁾ <1.0 | 5.2 | 1.8 | 4.8 |
| Benzo(a)Pyrene | T207 | M105 | 0.1 | mg/kg | 13 | ⁽⁹⁾ <1.0 | 4.4 | 1.8 | 3.8 |
| Indeno(123-cd)Pyrene | T207 | M105 | 0.1 | mg/kg | 7.8 | ⁽⁹⁾ <1.0 | 2.1 | 1.2 | 2.3 |
| Dibenzo(ah)Anthracene | T207 | M105 | 0.1 | mg/kg | 3.6 | ⁽⁹⁾ <1.0 | 1.0 | ⁽⁹⁾ <1.0 | 1.1 |
| Benzo(ghi)Perylene | T207 | M105 | 0.1 | mg/kg | 7.8 | ⁽⁹⁾ <1.0 | 2.2 | 1.3 | 2.3 |
| PAH(total) | T207 | M105 | 0.1 | mg/kg | 150 | 1.0 | 70 | 12 | 64 |

| Concept R | 656675 | | | | | | | | | |
|-----------------------|------------------------------------|---------------------|----------|--------------|-------------|-------------|-------------|--|--|--|
| Pro | Kent Street, Birmingham Additional | | | | | | | | | |
| Customer R | leference: | B063793.002/ST/8479 | | | | | | | | |
| Soil | | Analysed a | as Soil | | | | | | | |
| PAH US EPA 16 (B and | K split) | | | | | | | | | |
| | | - | Conce | pt Reference | 656675 008 | 656675 010 | 656675 011 | | | |
| | | Custon | ner Samp | le Reference | WS08 WS13 | | RC05 | | | |
| | | | | Depth | 2.40 | 2.00 | 3.00 | | | |
| | | | D | ate Sampled | 22-MAY-2017 | 23-MAY-2017 | 22-MAY-2017 | | | |
| | | | | Matrix Class | Sandy Soil | Sandy Soil | Sandy Soil | | | |
| Determinand | Method | Test
Sample | LOD | Units | | 6 | | | | |
| Naphthalene | T207 | M105 | 0.1 | mg/kg | <0.1 | <0.1 | <0.1 | | | |
| Acenaphthylene | T207 | M105 | 0.1 | mg/kg | <0.1 | <0.1 | <0.1 | | | |
| Acenaphthene | T207 | M105 | 0.1 | mg/kg | <0.1 | <0.1 | <0.1 | | | |
| Fluorene | T207 | M105 | 0.1 | mg/kg | <0.1 | <0.1 | <0.1 | | | |
| Phenanthrene | T207 | M105 | 0.1 | mg/kg | <0.1 | <0.1 | <0.1 | | | |
| Anthracene | T207 | M105 | 0.1 | mg/kg | <0.1 | <0.1 | <0.1 | | | |
| Fluoranthene | T207 | M105 | 0.1 | mg/kg | <0.1 | <0.1 | 0.2 | | | |
| Pyrene | T207 | M105 | 0.1 | mg/kg | <0.1 | <0.1 | 0.2 | | | |
| Benzo(a)Anthracene | T207 | M105 | 0.1 | mg/kg | <0.1 | <0.1 | <0.1 | | | |
| Chrysene | T207 | M105 | 0.1 | mg/kg | <0.1 | <0.1 | <0.1 | | | |
| Benzo(b)fluoranthene | T207 | M105 | 0.1 | mg/kg | <0.1 | <0.1 | <0.1 | | | |
| Benzo(k)fluoranthene | T207 | M105 | 0.1 | mg/kg | <0.1 | <0.1 | <0.1 | | | |
| Benzo(a)Pyrene | T207 | M105 | 0.1 | mg/kg | <0.1 | <0.1 | <0.1 | | | |
| Indeno(123-cd)Pyrene | T207 | M105 | 0.1 | mg/kg | <0.1 | <0.1 | <0.1 | | | |
| Dibenzo(ah)Anthracene | T207 | M105 | 0.1 | mg/kg | <0.1 | <0.1 | <0.1 | | | |
| Benzo(ghi)Perylene | T207 | M105 | 0.1 | mg/kg | <0.1 | <0.1 | <0.1 | | | |
| PAH(total) | T207 | M105 | 0.1 | mg/kg | <0.1 | <0.1 | 0.4 | | | |

Index to symbols used in 656675-1

| Value | Description |
|-------|--|
| M40 | Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis. |
| A40 | Assisted dried < 40C |

| M105 | Analysis conducted on an "as received" aliquot.
Results are reported on a dry weight basis where
moisture content was determined by assisted drying of
sample at 105C |
|------|--|
| AR | As Received |
| N.D. | Not Detected |
| 9 | LOD raised due to dilution of sample |
| 110 | LOD raised due to low internal standard recovery. |
| 13 | Results have been blank corrected. |
| S | Analysis was subcontracted |
| М | Analysis is MCERTS accredited |
| U | Analysis is UKAS accredited |
| Ν | Analysis is not UKAS accredited |

Notes

| Asbestos was subcontracted to REC Asbestos. |
|---|
| These samples have been analysed exceeding recommended holding times for Cyanide and Phenol. It is possible therefore that the results provided may be compromised. |

Method Index

| Value | Description |
|-------|-------------------------------------|
| T7 | Probe |
| Т8 | GC/FID |
| T207 | GC/MS (MCERTS) |
| T206 | GC/FID (MCERTS) |
| T54 | GC/MS (Headspace) |
| T6 | ICP/OES |
| T27 | PLM |
| T546 | Colorimetry (CF) |
| T162 | Grav (1 Dec) (105 C) |
| T287 | Calc TOC/0.58 |
| T2 | Grav |
| T242 | 2:1 Extraction/ICP/OES (TRL 447 T1) |

| Determinand | Method | Test
Sample | LOD | Units | Symbol | Concept References |
|-----------------------|--------|----------------|-----|-------|--------|--------------------|
| TPH (C8-C10) | Т8 | M105 | 1 | mg/kg | U | 008,010-011 |
| TPH (C10-C12) | T206 | M105 | 1 | mg/kg | М | 008,010-011 |
| TPH (C12-C16) | T206 | M105 | 1 | mg/kg | М | 008,010-011 |
| TPH (C16-C21) | T206 | M105 | 1 | mg/kg | М | 008,010-011 |
| TPH (C21-C35) | T206 | M105 | 1 | mg/kg | М | 008,010-011 |
| Arsenic | T6 | M40 | 2 | mg/kg | М | 003-008,010-011 |
| Cadmium | T6 | M40 | 1 | mg/kg | М | 003-008,010-011 |
| Chromium | T6 | M40 | 1 | mg/kg | М | 003-008,010-011 |
| Copper | T6 | M40 | 1 | mg/kg | М | 003-008,010-011 |
| Lead | T6 | M40 | 1 | mg/kg | М | 003-008,010-011 |
| Mercury | T6 | M40 | 1 | mg/kg | М | 003-008,010-011 |
| Nickel | T6 | M40 | 1 | mg/kg | М | 003-008,010-011 |
| Selenium | T6 | M40 | 3 | mg/kg | М | 003-008,010-011 |
| Zinc | T6 | M40 | 1 | mg/kg | М | 003-008,010-011 |
| Naphthalene | T207 | M105 | 0.1 | mg/kg | М | 003-008,010-011 |
| Acenaphthylene | T207 | M105 | 0.1 | mg/kg | U | 003-008,010-011 |
| Acenaphthene | T207 | M105 | 0.1 | mg/kg | М | 003-008,010-011 |
| Fluorene | T207 | M105 | 0.1 | mg/kg | М | 003-008,010-011 |
| Phenanthrene | T207 | M105 | 0.1 | mg/kg | М | 003-008,010-011 |
| Anthracene | T207 | M105 | 0.1 | mg/kg | U | 003-008,010-011 |
| Fluoranthene | T207 | M105 | 0.1 | mg/kg | м | 003-008,010-011 |
| Pyrene | T207 | M105 | 0.1 | mg/kg | М | 003-008,010-011 |
| Benzo(a)Anthracene | T207 | M105 | 0.1 | mg/kg | М | 003-008,010-011 |
| Chrysene | T207 | M105 | 0.1 | mg/kg | м | 003-008,010-011 |
| Benzo(b)fluoranthene | T207 | M105 | 0.1 | mg/kg | М | 003-008,010-011 |
| Benzo(k)fluoranthene | T207 | M105 | 0.1 | mg/kg | М | 003-008,010-011 |
| Benzo(a)Pyrene | T207 | M105 | 0.1 | mg/kg | м | 003-008,010-011 |
| Indeno(123-cd)Pyrene | T207 | M105 | 0.1 | mg/kg | М | 003-008,010-011 |
| Dibenzo(ah)Anthracene | T207 | M105 | 0.1 | mg/kg | М | 003-008,010-011 |
| Benzo(ghi)Perylene | T207 | M105 | 0.1 | mg/kg | М | 003-008,010-011 |
| PAH(total) | T207 | M105 | 0.1 | mg/kg | U | 003-008,010-011 |

| Determinand | Method | Test
Sample | LOD | Units | Symbol | Concept References |
|--------------------------------------|--------|----------------|-------|-------|--------|--------------------|
| Moisture @105C | T162 | AR | 0.1 | % | N | 003-008,010-011 |
| Asbestos ID | T27 | AR | | | SU | 003-007 |
| Boron (water-soluble) | T6 | AR | 1 | mg/kg | N | 003-008,010-011 |
| Chromium VI | Т6 | AR | 1 | mg/kg | N | 003-008,010-011 |
| Cyanide(Total) | T546 | AR | 1 | mg/kg | М | 003-008,010-011 |
| pН | T7 | AR | | | М | 003-008,010-011 |
| Phenols(Mono) | T546 | AR | 1 | mg/kg | М | 003-008,010-011 |
| Retained on 10mm sieve | T2 | M40 | 0.1 | % | N | 003-008,010-011 |
| Soil Organic Matter | T287 | A40 | 0.1 | % | N | 003-008,010-011 |
| (Water Soluble) SO4 expressed as SO4 | T242 | AR | 0.01 | g/l | N | 003-008,010-011 |
| Benzene | T54 | AR | 1 | µg/kg | U | 003-007 |
| Toluene | T54 | AR | 1 | µg/kg | U | 003-007 |
| EthylBenzene | T54 | AR | 1 | µg/kg | U | 003-007 |
| M/P Xylene | T54 | AR | 1 | µg/kg | U | 003-007 |
| O Xylene | T54 | AR | 1 | µg/kg | U | 003-007 |
| Methyl tert-Butyl Ether | T54 | AR | 1 | µg/kg | U | 003-007 |
| TPH (C5-C6 aliphatic) | T54 | AR | 0.010 | mg/kg | N | 003-007 |
| TPH (C6-C8 aliphatic) | T54 | AR | 0.010 | mg/kg | N | 003-007 |
| TPH (C8-C10 aliphatic) | T54 | AR | 0.010 | mg/kg | N | 003-007 |
| TPH (C10-C12 aliphatic) | Т8 | M105 | 1 | mg/kg | N | 003-007 |
| TPH (C12-C16 aliphatic) | Т8 | M105 | 1 | mg/kg | N | 003-007 |
| TPH (C16-C21 aliphatic) | Т8 | M105 | 1 | mg/kg | N | 003-007 |
| TPH (C21-C35 aliphatic) | Т8 | M105 | 1 | mg/kg | N | 003-007 |
| TPH (C6-C7 aromatic) | T54 | AR | 0.010 | mg/kg | N | 003-007 |
| TPH (C7-C8 aromatic) | T54 | AR | 0.010 | mg/kg | N | 003-007 |
| TPH (C8-C10 aromatic) | T54 | AR | 0.010 | mg/kg | N | 003-007 |
| TPH (C10-C12 aromatic) | Т8 | M105 | 1 | mg/kg | N | 003-007 |
| TPH (C12-C16 aromatic) | Т8 | M105 | 1 | mg/kg | N | 003-007 |
| TPH (C16-C21 aromatic) | T8 | M105 | 1 | mg/kg | N | 003-007 |
| TPH (C21-C35 aromatic) | Т8 | M105 | 1 | mg/kg | N | 003-007 |





Concept Life Sciences is a trading name of Scientific Analysis Laboratories registered in England and Wales (No 2514788)

Concept Life Sciences

Certificate of Analysis

Hadfield House Hadfield Street Combrook Manchester M16 9FE Tel : 0161 874 2400 Fax : 0161 874 2468

Report Number: 658265-1

Date of Report: 09-Jun-2017

Customer: Curtins Consulting Ltd. 2 The Wharf Bridge Street Birmingham B1 2JS

Customer Contact: Mr Rob Swinnerton

Customer Job Reference: B063793.002/RS/8477 Customer Purchase Order: EBBI78 Customer Site Reference: Kent Street, Birmingham Date Job Received at Concept: 22-May-2017 Date Analysis Started: 05-Jun-2017 Date Analysis Completed: 09-Jun-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

This report should not be reproduced except in full without the written approval of the laboratory Tests covered by this certificate were conducted in accordance with Concept SOPs



Report checked and authorised by : Bianca Prince Customer Service Manager Issued by : Bianca Prince Customer Service Manager

> Page 1 of 2 658265-1

| Concept Re | ference: | 658265 | | | | | | | |
|---|-----------|-------------------------|------------------|-------------------|-------------------------------|-------------------------------|--|--|--|
| Proj | ect Site: | Kent Street, Birmingham | | | | | | | |
| Customer Re | ference: | B063793.002/RS/8477 | | | | | | | |
| Soil
Miscellaneous | | Analysed a | Analysed as Soil | | | | | | |
| Concept Reference 658265 001 658265 002 | | | | | | | | | |
| | | Custor | e Reference | WS03 (655797/003) | TP03 (655797/008) | | | | |
| | | | Depth | 0.50 | 0.50 | | | | |
| | | | ate Sampled | 16-MAY-2017 | 18-MAY-2017 | | | | |
| Determinand | Method | Test
Sample | LOD | Units | | | | | |
| Asbestos Quantification | T27 | AR | 0.001 | % | Chrysotile Fibres
Detected | Chrysotile Fibres
Detected | | | |
| | | | | | <0.001 | <0.001 | | | |

Index to symbols used in 658265-1

| Value | Description |
|-------|-----------------------------|
| AR | As Received |
| S | Analysis was subcontracted |
| U | Analysis is UKAS accredited |
| | |

Notes

Asbestos was subcontracted to REC Asbestos.

Method Index

| Determinand | Method | Test
Sample | LOD | Units | Symbol | Concept References |
|-------------------------|--------|----------------|-------|-------|--------|--------------------|
| Asbestos Quantification | T27 | AR | 0.001 | % | SU | 001-002 |





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Concept Life Sciences

Certificate of Analysis

Hadfield House Hadfield Street Combrook Manchester M16 9FE Tel : 0161 874 2400 Fax : 0161 874 2468

Report Number: 659212-1

Date of Report: 13-Jun-2017

Customer: Curtins Consulting Ltd. 2 The Wharf Bridge Street Birmingham B1 2JS

Customer Contact: Mr Rob Swinnerton

Customer Job Reference: B063793.002/ST/8479 Customer Site Reference: Kent Street, Birmingham Additional Date Job Received at Concept: 25-May-2017 Date Analysis Started: 13-Jun-2017 Date Analysis Completed: 13-Jun-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

This report should not be reproduced except in full without the written approval of the laboratory Tests covered by this certificate were conducted in accordance with Concept SOPs



Report checked and authorised by : Bianca Prince Customer Service Manager Issued by : Bianca Prince Customer Service Manager

> Page 1 of 2 659212-1

| Concept Re | eference: | 659212 | | | | | |
|------------------------------|------------|----------------|-------------|---------------|-------------------------------|--|--|
| Pro | ject Site: | Kent Stree | t, Birmingh | am Additional | | | |
| Customer Re | eference: | B063793.0 | 02/ST/847 | 9 | | | |
| Soil
Miscellaneous | | Analysed a | as Soil | | | | |
| Concept Reference 659212 001 | | | | | | | |
| | | Custor | ner Sampl | e Reference | TP09 (656675/004) | | |
| | | | Da | 19-MAY-2017 | | | |
| Determinand | Method | Test
Sample | LOD | Units | | | |
| Asbestos Quantification | T27 | AR | 0.001 | % | Chrysotile Fibres
Detected | | |
| | | | | | <0.001 | | |

Index to symbols used in 659212-1

| Value | Description | | | | | | |
|-------|-----------------------------|--|--|--|--|--|--|
| AR | As Received | | | | | | |
| S | Analysis was subcontracted | | | | | | |
| U | Analysis is UKAS accredited | | | | | | |

Notes

Asbestos was subcontracted to REC Asbestos.

Method Index

ValueDescriptionT27PLM

| Determinand | Method | Test
Sample | LOD | Units | Symbol | Concept References |
|-------------------------|--------|----------------|-------|-------|--------|--------------------|
| Asbestos Quantification | T27 | AR | 0.001 | % | SU | 001 |





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Concept Life Sciences

Certificate of Analysis

Hadfield House Hadfield Street Combrook Manchester M16 9FE Tel : 0161 874 2400 Fax : 0161 874 2468

Report Number: 662277-1

Date of Report: 27-Jun-2017

Customer: Curtins Consulting Ltd. 2 The Wharf Bridge Street Birmingham B1 2JS

Customer Contact: Mr Rob Swinnerton

Customer Job Reference: 063793-CUR-00-XX-SH-GE-001-V01_Water_Analysis Customer Purchase Order: EBBI92 Customer Site Reference: Kent Street, Birmingham Date Job Received at Concept: 19-Jun-2017 Date Analysis Started: 21-Jun-2017 Date Analysis Completed: 27-Jun-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

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Report checked and authorised by : Bianca Prince Customer Service Manager Issued by : Bianca Prince Customer Service Manager

Page 1 of 5 662277-1

Concept Reference: 662277 Project Site: Kent Street, Birmingham Customer Reference: 063793-CUR-00-XX-SH-GE-001-V01_Water_Analysis

Analysed as Water

Water

Heavy Metals(9)

| | | | Conce | 662277 001 | 662277 002 | 662277 003 | 662277 004 | |
|----------------|--------|----------------|-------|-------------|-------------|-------------|-------------|-------------|
| | | Custor | RC01 | RC02 | RC03 | RC05 | | |
| | | | D | ate Sampled | 16-JUN-2017 | 16-JUN-2017 | 16-JUN-2017 | 16-JUN-2017 |
| Determinand | Method | Test
Sample | LOD | Units | | | | |
| As (Dissolved) | T281 | AR | 0.2 | µg/l | 1.0 | 0.7 | 0.3 | 0.6 |
| Cd (Dissolved) | T281 | AR | 0.02 | µg/l | 0.03 | <0.02 | 0.26 | 0.22 |
| Cr (Dissolved) | T281 | AR | 1 | µg/l | <1 | 1 | 92 | 5 |
| Cu (Dissolved) | T281 | AR | 0.5 | µg/l | 4.2 | 2.5 | 2.9 | 3.5 |
| Pb (Dissolved) | T281 | AR | 0.3 | µg/l | <0.3 | <0.3 | <0.3 | <0.3 |
| Hg (Dissolved) | T281 | AR | 0.05 | µg/l | <0.05 | 0.07 | 0.06 | 0.06 |
| Ni (Dissolved) | T281 | AR | 1 | µg/l | 4 | 4 | 19 | 8 |
| Se (Dissolved) | T281 | AR | 0.5 | µg/l | 2.6 | 2.9 | 2.4 | 3.2 |
| Zn (Dissolved) | T281 | AR | 2 | µg/l | 14 | <2 | 13 | 7 |

Concept Reference: 662277

Project Site: Kent Street, Birmingham

Customer Reference: 063793-CUR-00-XX-SH-GE-001-V01_Water_Analysis

Water

Analysed as Water

Curtins Water Suite 1

| | Concept Reference | | | | | | | 662277 004 |
|-----------------------------|-------------------|----------------|-------------|-------------|-------|-------|-------|------------|
| | | Custon | RC01 | RC02 | RC03 | RC05 | | |
| | 16-JUN-2017 | 16-JUN-2017 | 16-JUN-2017 | 16-JUN-2017 | | | | |
| Determinand | Method | Test
Sample | LOD | Units | | | 1872 | |
| B (Dissolved) | T373 | AR | 0.01 | mg/l | 0.35 | 0.85 | 0.62 | 0.69 |
| Cyanide(Total) | T4 | AR | 0.05 | mg/l | <0.05 | <0.05 | <0.05 | <0.05 |
| Hardness expressed as CaCO3 | T6 | AR | 10 | mg/l | 520 | 620 | 360 | 500 |
| рН | T7 | AR | | Red (BRA) | 6.3 | 7.1 | 6.2 | 6.8 |
| Sulphate | T686 | F | 0.5 | mg/l | 84 | 500 | 240 | 270 |
| Sulphide | T4 | AR | 0.05 | mg/l | 0.07 | 0.06 | 0.06 | 0.06 |

Concept Reference: 662277

Project Site: Kent Street, Birmingham

Customer Reference: 063793-CUR-00-XX-SH-GE-001-V01_Water_Analysis

Water

Analysed as Water

BTEX GRO MTBE

| | | | Concep | 662277 001 | 662277 002 | 662277 003 | 662277 004 | |
|-------------------------|--------|----------------|-------------|-------------|--------------------|--------------------|--------------------|--------------------|
| | | Custor | ner Sampl | e Reference | RC01 | RC02 | RC03 | RC05 |
| | | | 16-JUN-2017 | 16-JUN-2017 | 16-JUN-2017 | 16-JUN-2017 | | |
| Determinand | Method | Test
Sample | LOD | Units | | | | |
| Benzene | T54 | AR | 1 | µg/l | ⁽¹³⁾ <1 | ⁽¹³⁾ <1 | ⁽¹³⁾ <1 | ⁽¹³⁾ <1 |
| EthylBenzene | T54 | AR | 1 | µg/l | <1 | <1 | <1 | <1 |
| M/P Xylene | T54 | AR | 1 | µg/l | <1 | <1 | <1 | <1 |
| Methyl tert-Butyl Ether | T54 | AR | 1 | µg/l | <1 | <1 | <1 | <1 |
| O Xylene | T54 | AR | 1 | µg/l | <1 | <1 | <1 | <1 |
| Toluene | T54 | AR | 1 | µg/l | <1 | <1 | <1 | <1 |
| TPH (C6-C10) | T215 | AR | 0.010 | mg/l | <0.010 | <0.010 | <0.010 | <0.010 |

Concept Reference: 662277 Project Site: Kent Street, Birmingham Customer Reference: 063793-CUR-00-XX-SH-GE-001-V01_Water_Analysis

Analysed as Water

Water

TPH (CWG) **Concept Reference** 662277 001 662277 002 662277 003 662277 004 Customer Sample Reference RC01 RC02 RC03 **RC05** Date Sampled 16-JUN-2017 16-JUN-2017 16-JUN-2017 16-JUN-2017 Test Sample Determinand Method LOD Units TPH (C5-C6 aliphatic) T215 0.010 AR mg/l < 0.010 < 0.010 < 0.010 < 0.010 TPH (C6-C8 aliphatic) T215 AR 0.010 <0.010 <0.010 <0.010 <0.010 mg/l TPH (C8-C10 aliphatic) T215 AR 0.010 <0.010 <0.010 <0.010 <0.010 mg/l TPH DW(C10-C12 aliphatic) (13) < 0.01 (100,13) < 0.02 (13) < 0.01 (13) < 0.01 AR 0.01 T81 mg/l (100,13) <0.02 (13) <0.01 TPH DW(C12-C16 aliphatic) T81 AR 0.01 ⁽¹³⁾ <0.01 ⁽¹³⁾ <0.01 mg/ (13) < 0.01 (100,13) < 0.02 (13) < 0.01 (13) < 0.01 TPH DW(C16-C21 aliphatic) T81 AR 0.01 mg/l ⁽¹³⁾ <0.01 ⁽¹³⁾ 0.06 ⁽¹³⁾ <0.01 ⁽¹³⁾ <0.01 TPH DW(C21-C35 aliphatic) T81 AR 0.01 mg/l ⁽¹³⁾ N.D. (13) 0.06 ⁽¹³⁾ N.D. ⁽¹³⁾ N.D. TPH (Aliphatic) total T85 AR mg/l TPH (C6-C7 aromatic) T215 AR 0.010 mg/l <0.010 < 0.010 < 0.010 <0.010 TPH (C7-C8 aromatic) T215 AR 0.010 <0.010 <0.010 <0.010 <0.010 mg/l TPH (C8-C10 aromatic) T215 AR 0.010 mg/l <0.010 <0.010 <0.010 <0.010 (100,13) < 0.02 (13) < 0.01 (13) < 0.01 TPH DW(C10-C12 aromatic) (13) < 0.01 T81 AR 0.01 mg/l (13,100) < 0.02 (13) <0.01 (13) <0.01 (13) <0.01 TPH DW(C12-C16 aromatic) T81 AR 0.01 mg/l (13) < 0.01 (13) <0.01 (13) <0.01 (13) 0.02 TPH DW(C16-C21 aromatic) 0.01 T81 AR mg/l (13) 0.04 (13) <0.01 (13) <0.01 TPH DW(C21-C35 aromatic) (13) <0.01 T81 AR 0.01 mg/l ⁽¹³⁾ N.D. (13) 0.06 (13) N.D. (13) N.D. TPH (Aromatic) total T85 AR mg/l

Concept Reference: 662277

Project Site: Kent Street, Birmingham

Customer Reference: 063793-CUR-00-XX-SH-GE-001-V01_Water_Analysis

Water

| Analysec | as | Water |
|----------|----|-------|
| | | |

| | 16 (D | and K | colit) |
|--------|-------|-------|--------|
| JO EFA | 10 (D | anu n | spiit |

| | | | 662277 001 | 662277 002 | 662277 003 | 662277 004 | | |
|-----------------------|--------|----------------|------------|-------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | | Custon | RC01 | RC02 | RC03 | RC05 | | |
| | | | Da | ate Sampled | 16-JUN-2017 | 16-JUN-2017 | 16-JUN-2017 | 16-JUN-2017 |
| Determinand | Method | Test
Sample | LOD | Units | | | | |
| Naphthalene | T149 | AR | 0.01 | µg/l | ⁽¹³⁾ <0.01 | ⁽¹³⁾ <0.01 | ⁽¹³⁾ <0.01 | ⁽¹³⁾ <0.01 |
| Acenaphthylene | T149 | AR | 0.01 | µg/l | <0.01 | 0.01 | <0.01 | <0.01 |
| Acenaphthene | T149 | AR | 0.01 | µg/l | ⁽¹³⁾ <0.01 | ⁽¹³⁾ 0.01 | ⁽¹³⁾ 0.01 | ⁽¹³⁾ 0.01 |
| Fluorene | T149 | AR | 0.01 | µg/l | ⁽¹³⁾ <0.01 | ⁽¹³⁾ <0.01 | ⁽¹³⁾ <0.01 | ⁽¹³⁾ <0.01 |
| Phenanthrene | T149 | AR | 0.01 | µg/l | ⁽¹³⁾ <0.01 | ⁽¹³⁾ 0.02 | ⁽¹³⁾ 0.01 | ⁽¹³⁾ 0.02 |
| Anthracene | T149 | AR | 0.01 | µg/l | 0.01 | 0.02 | 0.01 | 0.01 |
| Fluoranthene | T149 | AR | 0.01 | µg/l | 0.01 | 0.02 | 0.01 | 0.01 |
| Pyrene | T149 | AR | 0.01 | µg/l | 0.01 | 0.03 | 0.03 | 0.01 |
| Benzo(a)Anthracene | T149 | AR | 0.01 | µg/l | <0.01 | 0.01 | <0.01 | <0.01 |
| Chrysene | T149 | AR | 0.01 | µg/l | <0.01 | 0.01 | <0.01 | 0.01 |
| Benzo(b)fluoranthene | T149 | AR | 0.01 | µg/l | <0.01 | 0.01 | <0.01 | <0.01 |
| Benzo(k)fluoranthene | T149 | AR | 0.01 | µg/l | <0.01 | 0.01 | <0.01 | <0.01 |
| Benzo(a)Pyrene | T149 | AR | 0.01 | µg/l | <0.01 | 0.01 | <0.01 | <0.01 |
| Indeno(123-cd)Pyrene | T149 | AR | 0.01 | µg/l | <0.01 | 0.01 | <0.01 | <0.01 |
| Dibenzo(ah)Anthracene | T149 | AR | 0.01 | µg/l | <0.01 | <0.01 | <0.01 | <0.01 |
| Benzo(ghi)Perylene | T149 | AR | 0.01 | µg/l | <0.01 | 0.01 | <0.01 | <0.01 |
| PAH(total) | T149 | AR | 0.01 | µg/l | 0.03 | 0.18 | 0.07 | 0.07 |

Index to symbols used in 662277-1

| Value | Description | | | | | |
|-------|--|--|--|--|--|--|
| AR | As Received | | | | | |
| F | Filtered | | | | | |
| N.D. | Not Detected | | | | | |
| 13 | Results have been blank corrected. | | | | | |
| 100 | LOD determined by sample aliquot used for analysis | | | | | |
| U | Analysis is UKAS accredited | | | | | |
| N | Analysis is not UKAS accredited | | | | | |

Notes

Samples submitted for GC/MS (Headspace) analysis were submitted in inappropriate containers. It is possible therefore that the results provided may be compromised. These samples have been analysed exceeding recommended holding times for TPH C10-C35. It is possible therefore that the results provided may be compromised.

Method Index

| Value | Description |
|-------|-----------------------|
| Т6 | ICP/OES |
| T215 | GC/MS (Headspace)(LV) |
| T281 | ICP/MS (Filtered) |
| T81 | GC/FID (LV) |
| T373 | ICP/OES (Filtered) |
| T686 | Discrete Analyser |
| T4 | Colorimetry |
| T7 | Probe |
| T54 | GC/MS (Headspace) |
| T85 | Calc |
| T149 | GC/MS (SIR) |

| Determinand | Method | Test
Sample | LOD | Units | Symbol | Concept References |
|-----------------------------|--------|----------------|-------|-------|--------|--------------------|
| B (Dissolved) | T373 | AR | 0.01 | mg/l | N | 001-004 |
| Cyanide(Total) | T4 | AR | 0.05 | mg/l | U | 001-004 |
| Hardness expressed as CaCO3 | Т6 | AR | 10 | mg/l | N | 001-004 |
| рН | T7 | AR | | | U | 001-004 |
| Sulphate | T686 | F | 0.5 | mg/l | U | 001-004 |
| Sulphide | T4 | AR | 0.05 | mg/l | N | 001-004 |
| As (Dissolved) | T281 | AR | 0.2 | µg/l | U | 001-004 |
| Cd (Dissolved) | T281 | AR | 0.02 | µg/l | U | 001-004 |
| Cr (Dissolved) | T281 | AR | 1 | µg/l | U | 001-004 |
| Cu (Dissolved) | T281 | AR | 0.5 | µg/l | U | 001-004 |
| Pb (Dissolved) | T281 | AR | 0.3 | µg/l | U | 001-004 |
| Hg (Dissolved) | T281 | AR | 0.05 | µg/l | U | 001-004 |
| Ni (Dissolved) | T281 | AR | 1 | µg/l | U | 001-004 |
| Se (Dissolved) | T281 | AR | 0.5 | µg/l | U | 001-004 |
| Zn (Dissolved) | T281 | AR | 2 | µg/l | U | 001-004 |
| TPH (C5-C6 aliphatic) | T215 | AR | 0.010 | mg/l | Ν | 001-004 |
| TPH (C6-C8 aliphatic) | T215 | AR | 0.010 | mg/l | Ν | 001-004 |
| TPH (C8-C10 aliphatic) | T215 | AR | 0.010 | mg/l | Ν | 001-004 |
| TPH DW(C10-C12 aliphatic) | T81 | AR | 0.01 | mg/l | N | 001-004 |
| TPH DW(C12-C16 aliphatic) | T81 | AR | 0.01 | mg/l | Ν | 001-004 |
| TPH DW(C16-C21 aliphatic) | T81 | AR | 0.01 | mg/l | Ν | 001-004 |
| TPH DW(C21-C35 aliphatic) | T81 | AR | 0.01 | mg/l | Ν | 001-004 |
| TPH (Aliphatic) total | T85 | AR | | mg/l | N | 001-004 |
| TPH (C6-C7 aromatic) | T215 | AR | 0.010 | mg/l | N | 001-004 |
| TPH (C7-C8 aromatic) | T215 | AR | 0.010 | mg/l | N | 001-004 |
| TPH (C8-C10 aromatic) | T215 | AR | 0.010 | mg/l | N | 001-004 |
| TPH DW(C10-C12 aromatic) | T81 | AR | 0.01 | mg/l | N | 001-004 |
| TPH DW(C12-C16 aromatic) | T81 | AR | 0.01 | mg/l | N | 001-004 |
| TPH DW(C16-C21 aromatic) | T81 | AR | 0.01 | mg/l | Ν | 001-004 |
| TPH DW(C21-C35 aromatic) | T81 | AR | 0.01 | mg/l | N | 001-004 |
| TPH (Aromatic) total | T85 | AR | | mg/l | N | 001-004 |
| Benzene | T54 | AR | 1 | µg/l | U | 001-004 |
| EthylBenzene | T54 | AR | 1 | µg/l | U | 001-004 |
| M/P Xylene | T54 | AR | 1 | µg/l | U | 001-004 |
| Methyl tert-Butyl Ether | T54 | AR | 1 | µg/l | U | 001-004 |
| O Xylene | T54 | AR | 1 | µg/l | U | 001-004 |
| Toluene | T54 | AR | 1 | µg/l | U | 001-004 |
| TPH (C6-C10) | T215 | AR | 0.010 | mg/l | N | 001-004 |
| Naphthalene | T149 | AR | 0.01 | µg/l | U | 001-004 |
| Acenaphthylene | T149 | AR | 0.01 | µg/l | U | 001-004 |
| Acenaphthene | T149 | AR | 0.01 | µg/l | U | 001-004 |
| Fluorene | T149 | AR | 0.01 | µg/l | U | 001-004 |
| Phenanthrene | T149 | AR | 0.01 | µg/l | U | 001-004 |
| Anthracene | T149 | AR | 0.01 | µg/l | U | 001-004 |
| Fluoranthene | T149 | AR | 0.01 | µg/l | U | 001-004 |

| Determinand | Method | Test
Sample | LOD | Units | Symbol | Concept References |
|-----------------------|--------|----------------|------|-------|--------|--------------------|
| Pyrene | T149 | AR | 0.01 | µg/l | U | 001-004 |
| Benzo(a)Anthracene | T149 | AR | 0.01 | µg/l | U | 001-004 |
| Chrysene | T149 | AR | 0.01 | µg/l | U | 001-004 |
| Benzo(b)fluoranthene | T149 | AR | 0.01 | µg/l | U | 001-004 |
| Benzo(k)fluoranthene | T149 | AR | 0.01 | µg/l | U | 001-004 |
| Benzo(a)Pyrene | T149 | AR | 0.01 | µg/l | U | 001-004 |
| Indeno(123-cd)Pyrene | T149 | AR | 0.01 | µg/l | U | 001-004 |
| Dibenzo(ah)Anthracene | T149 | AR | 0.01 | µg/l | U | 001-004 |
| Benzo(ghi)Perylene | T149 | AR | 0.01 | µg/l | U | 001-004 |
| PAH(total) | T149 | AR | 0.01 | µg/l | U | 001-004 |





Phase 2 Site Investigation

Appendix A4 – Geotechnical Laboratory Testing Results

- Geotechnical Analysis Results
 - o Concept Life Sciences, Certificate No. 655806-1
 - o Concept Life Sciences, Certificate No. 656999-1
 - o GEO Site & Testing Services Ltd, Contract No. 35507
 - o Professional Soils Laboratory, Certificate No. PSL17/2511
 - Professional Soils Laboratory, Certificate No. PSL17/2608
 - o Professional Soils Laboratory, Certificate No. PSL17/2383





Qty

Contract Number: 35507

Client's Reference: RT/17/59761

Laboratory Report

Report Date: 23-06-2017

Client Geocore Site Investigations Ltd Tralee Close. Kirkleatham Business Park Redcar TS10 5SG

Contract Title: Kent Street For the attention of: D. Comer

Date Received: **10-06-2017** Date Commenced: **10-06-2017** Date Completed: **23-06-2017**

| Dispass of Samples on Project | 4 |
|---|----|
| ISRM Suggested Method for Point Load Strength 1974-2006 - * UKAS | |
| Determination of Point Load Value Axial or Diametrical including WC | 20 |
| ISRM Part 1 Methods For Rock Characterisation 1974-2006 - @ Non Accredited Test | |
| Uniaxial Compressive Strength of Rock Materials with Sample Preperation Charge for 54-165mm
Diameter Cores | 4 |
| | |

Disposal of Samples on Project

Notes: Observations and Interpretations are outside the UKAS Accreditation

- * denotes test included in laboratory scope of accreditation
- # denotes test carried out by approved contractor
- $\ensuremath{@}$ denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory. **Approved Signatories:**

Alex Wynn (Associate Director) - Ben Sharp (Contracts Manager) - Emma Sharp (Office Manager) Paul Evans (Quality/Technical Manager) - Richard John (Advanced Testing Manager) - Sean Penn (Administrative/Quality Assistant) Vaughan Edwards (Managing Director) - Wayne Honey (Administrative/Quality Assistant)

| CCTI | Point Load Test | |
|-----------------|--|--|
| GOIL | Int. J. Rock Mech. Sci. & Geomech. Abstr. Vol. 22, No. 2, pp. 51 - 60, 1985. | |
| Contract Number | 35507 | |
| Site Name | Kent Street | |
| Sample Type | Core | |
| Date Tested | 22/06/2017 | |
| | | |

| Hole | | | | Tost | Type | | Platan | Epiluro | Equivalent | | Sizo | Point Load | Moisturo | | Angle Between Plane | Type of Anisotropy |
|-----------|-------|----------|----|---------|------|-------|------------|---------|------------|------------|--------|------------|----------|-------------|----------------------|-----------------------|
| Poforence | De | epth (r | n) | | Type | Width | Seperation | Load | Diameter | Point Load | Factor | Index | Content | Description | of Anisotropy & Core | (Bedding or Cleavage) |
| Relefence | 12.50 | | | d/a/b/i | 1// | | . 71 | 0.97 | | 0.17 | 1 17 | 0.20 | 10.1 | SANDSTONE | Axis | |
| RBH01 | 12.50 | - | | d | | | 71 | 0.87 | | 0.17 | 1.17 | 0.20 | 10.1 | SANDSTONE | | |
| RBH02 | 20.40 | - | | d | | | 70 | 0.30 | | 0.07 | 1.10 | 0.03 | 10.3 | SANDSTONE | | |
| RBH02 | 20.75 | | | d | | | 70 | 0.60 | | 0.14 | 1.17 | 0.10 | 4 9 | SANDSTONE | | |
| RBH02 | 22.40 | - | | b
d | | | 70 | 0.00 | | 0.12 | 1.10 | 0.14 | 5.1 | SANDSTONE | | |
| RBH02 | 23.60 | - | | b b | | | 72 | 0.65 | | 0.13 | 1.18 | 0.15 | 10.4 | SANDSTONE | | |
| RBH04 | 15.10 | - | | d | | | 69 | 0.33 | | 0.07 | 1.16 | 0.08 | 6.0 | SANDSTONE | | |
| RBH04 | 18.70 | - | | d | | 72 | 72 | 0.48 | 81.24 | 0.07 | 1.24 | 0.09 | 4.8 | SANDSTONE | | |
| RBH04 | 18.70 | - | | а | | | 72 | 0.44 | | 0.08 | 1.18 | 0.10 | 5.1 | SANDSTONE | | |
| RBH04 | 21.40 | - | | d | | | 71 | 0.53 | | 0.10 | 1.17 | 0.12 | 10.1 | SANDSTONE | | |
| RBH04 | 24.95 | - | | d | | | 71 | 0.81 | | 0.16 | 1.17 | 0.19 | 14.0 | SANDSTONE | | |
| RBH05 | 12.20 | - | | d | | | 71 | 0.56 | | 0.11 | 1.17 | 0.13 | 11.0 | SANDSTONE | | |
| RBH05 | 13.50 | - | | d | | | 71 | 0.53 | | 0.10 | 1.17 | 0.12 | 13.4 | SANDSTONE | | |
| RBH05 | 15.70 | - | | d | | | 71 | 0.10 | | 0.02 | 1.17 | 0.02 | 6.3 | SANDSTONE | | |
| RBH05 | 16.45 | - | | i | | 73 | 34 | 0.38 | 56.22 | 0.12 | 1.05 | 0.13 | 10.1 | SANDSTONE | | |
| RBH05 | 18.50 | - | | d | | | 72 | 0.18 | | 0.04 | 1.18 | 0.04 | 10.3 | SANDSTONE | | |
| RBH05 | 20.40 | - | | d | | | 71 | 0.85 | | 0.17 | 1.17 | 0.20 | 8.6 | SANDSTONE | | |
| RBH05 | 22.20 | - | | d | | | 71 | 0.83 | | 0.16 | 1.17 | 0.19 | 9.9 | SANDSTONE | | |
| RBH05 | 23.30 | - | | d | | | 72 | 1.28 | | 0.25 | 1.18 | 0.29 | 9.1 | SANDSTONE | | |
| RBH05 | 25.15 | - | | d | | | 71 | 0.73 | | 0.14 | 1.17 | 0.17 | 11.1 | SANDSTONE | | |
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| Key | Reported As |
|---------------------|--------------|
| Width | (W) mm |
| Platen Separation | (D) mm |
| Failure Load | (P) kN |
| Equivalent Diameter | (De) mm |
| Point Load | (Is) MPa |
| Size Factor | (F) |
| Point Load Index | (Is(50)) MPa |
| Moisture Content | % |
| Description | SC |

| Operators | Checked | 22/06/2017 | Wayne Honey | W. Honey |
|-----------|----------|------------|-------------|----------|
| JD | Approved | 23/06/2017 | Ben Sharp | |





GSTL Determination of Unconfined Compressive Strength ISRM Suggested Methods Vol 16, No. 2, pp. 135-140 1979

| Contract Number | 35507 | |
|--------------------|---------------------|--|
| Site Name | Kent Street | |
| Sample Preperation | Sawing and Grinding | |
| Date Tested | 22/06/2017 | |

| Hole
Reference | Depth (m) | | Diameter | Length | Initial
Mass | Moisture
Content | Bulk
Density | Dry
Density | Load
Failure | Maximum
Strength | Type of Failure | |
|-------------------|-----------|--|----------|--------|-----------------|---------------------|-----------------|----------------|-----------------|---------------------|-----------------|-----------------|
| RBH04 | 22.30 | | | 72 | 163.9 | 1380.8 | 9.50 | 2.07 | 1.89 | 32.7 | 8.0 | Axial Splitting |
| RBH05 | 19.50 | | | 72.2 | 170 | 1598.0 | 10.10 | 2.30 | 2.09 | 39.6 | 9.7 | Axial Splitting |
| RBH05 | 22.90 | | | 72.6 | 180 | 1659.3 | 8.80 | 2.23 | 2.05 | 72.1 | 17.4 | Axial Splitting |
| RBH05 | 26.15 | | | 73.4 | 138.5 | 1212.9 | 9.60 | 2.07 | 1.89 | 56.5 | 13.4 | Axial Splitting |
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| Key | Reported As |
|------------------|-------------------|
| Diameter | mm |
| Length | mm |
| Initial Mass | g |
| Moisture Content | % |
| Bulk Density | Mg/m ³ |
| Dry Density | Mg/m ³ |
| Load Failure | kN |
| Maximum Strength | mpa |
| | |

| Operators | Checked | 22/06/2017 | Wayne Honey | W. Honey |
|-----------|----------|------------|-------------|----------|
| JD | Approved | 23/06/2017 | Ben Sharp | |



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Concept Life Sciences

Certificate of Analysis

Hadfield House Hadfield Street Combrook Manchester M16 9FE Tel : 0161 874 2400 Fax : 0161 874 2468

Report Number: 655806-1

Date of Report: 14-Jun-2017

Customer: Curtins Consulting Ltd. 2 The Wharf Bridge Street Birmingham B1 2JS

Customer Contact: Mr Rob Allen

Customer Job Reference: B063793.002/RS/8477 Customer Purchase Order: EBBi 78 Customer Site Reference: Kent Street Date Job Received at Concept: 22-May-2017 Date Analysis Started: 25-May-2017 Date Analysis Completed: 14-Jun-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation This report should not be reproduced except in full without the written approval of the laboratory Tests covered by this certificate were conducted in accordance with Concept SOPs





Report checked and authorised by : Bianca Prince Customer Service Manager Issued by : Bianca Prince Customer Service Manager

> Page 1 of 3 655806-1

Concept Reference: 655806 Project Site: Kent Street Customer Reference: B063793.002/RS/8477

Analysed as Soil

Soil

| Miscellaneous | | | | | | | | | |
|----------------|-----------|----------------|--------|-------------|-------------|-------------|-------------|-------------|-------------|
| | | | Concep | t Reference | 655806 001 | 655806 002 | 655806 003 | 655806 004 | 655806 005 |
| | ner Sampl | e Reference | WS01 | WS02 | WS03 | WS03 | WS04 | | |
| | | | | Depth | 3.00 | 7.00 | 2.00 | 4.00 | 2.00 |
| | | | Da | ate Sampled | 15-MAY-2017 | 15-MAY-2017 | 16-MAY-2017 | 16-MAY-2017 | 16-MAY-2017 |
| Determinand | Method | Test
Sample | LOD | Units | | | | | |
| рН | T7 | A40 | | | 7.9 | 8.2 | 8.3 | 9.1 | 8.5 |
| SO4(2:1) | T6 | AR | 0.1 | g/l | <0.1 | <0.1 | <0.1 | <0.1 | 0.7 |
| Moisture @105C | T162 | AR | 0.1 | % | 9.6 | 16 | 13 | 16 | 18 |

Concept Reference: 655806 Project Site: Kent Street

Customer Reference: B063793.002/RS/8477

Analysed as Soil

Soil Miscellaneous

| | | | | | 1000 | | | |
|----------------|--------|----------------|-------------|-------------|-------------|-------------|------------|------|
| | | | Conce | 655806 006 | 655806 007 | 655806 008 | 655806 009 | |
| | | Custon | ner Sampl | WS05 | TP01 | TP02 | TP03 | |
| | | 1.20 | 1.00 | 1.80 | 1.50 | | | |
| | D | ate Sampled | 16-MAY-2017 | 18-MAY-2017 | 18-MAY-2017 | 18-MAY-2017 | | |
| Determinand | Method | Test
Sample | LOD | Units | | 1. A | | |
| рН | T7 | A40 | | | 10.9 | 9.1 | 8.9 | 8.6 |
| SO4(2:1) | T6 | AR | 0.1 | g/l | <0.1 | <0.1 | <0.1 | <0.1 |
| Moisture @105C | T162 | AR | 0.1 | % | 12 | 18 | 15 | 16 |

| Concept | Reference: | 655806 | 250 | 1.2 | | | | |
|---------------|---------------------|------------------|-------------|--------------|-------------|-------------|--|--|
| F | roject Site: | Kent Stre | Kent Street | | | | | |
| Customer | Customer Reference: | | | 77 | | | | |
| Soil | Analysed | Analysed as Soil | | | | | | |
| Particle Size | | | | | | | | |
| | | | Concer | ot Reference | 655806 007 | 655806 009 | | |
| | | Custor | ner Sampl | e Reference | TP01 | TP03 | | |
| | | | | Depth | 1.00 | 1.50 | | |
| | | | Da | ate Sampled | 18-MAY-2017 | 18-MAY-2017 | | |
| Determinand | Method | Test
Sample | LOD | Units | | 12 | | |
| PSD (<63 um) | T2 | AR | 0.1 | % | Attached | Attached | | |
| PSD (>63 um) | T2 | AR | 0.1 | % | Attached | Attached | | |
| | | | | | | | | |

Index to symbols used in 655806-1

| Value | Description |
|-------|---------------------------------|
| A40 | Assisted dried < 40C |
| AR | As Received |
| s | Analysis was subcontracted |
| U | Analysis is UKAS accredited |
| N | Analysis is not UKAS accredited |

Notes

PSD is subcontracted to PSL for analysis

Method Index

| Value | Description |
|-------|-------------|
| T2 | Grav |
| T6 | ICP/OES |

| T162 | Grav (1 Dec) (105 C) |
|------|----------------------|
| T7 | Probe |

| Determinand | Method | Test
Sample | LOD | Units | Symbol | Concept References |
|----------------|--------|----------------|-----|-------|--------|--------------------|
| PSD (<63 um) | T2 | AR | 0.1 | % | SN | 007,009 |
| PSD (>63 um) | T2 | AR | 0.1 | % | SN | 007,009 |
| pН | T7 | A40 | | | U | 001-009 |
| SO4(2:1) | T6 | AR | 0.1 | g/l | N | 001-009 |
| Moisture @105C | T162 | AR | 0.1 | % | N | 001-009 |





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Concept Life Sciences

Certificate of Analysis

Hadfield House Hadfield Street Combrook Manchester M16 9FE Tel : 0161 874 2400 Fax : 0161 874 2468

Report Number: 656999-1

Date of Report: 08-Jun-2017

Customer: Curtins Consulting Ltd. 2 The Wharf Bridge Street Birmingham B1 2JS

Customer Contact: Mr Sean Taylor

Customer Job Reference: B063793.002/ST/8479 Customer Purchase Order: EBBi78 Customer Site Reference: Kent Street Birmingham Additional Date Job Received at Concept: 25-May-2017 Date Analysis Started: 30-May-2017 Date Analysis Completed: 08-Jun-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation This report should not be reproduced except in full without the written approval of the laboratory Tests covered by this certificate were conducted in accordance with Concept SOPs





Report checked and authorised by : Bianca Prince Customer Service Manager Issued by : Bianca Prince Customer Service Manager

> Page 1 of 3 656999-1

| Concept R | | | | | | | | | |
|-----------------------|---|----------|-----------|--------------|-------------|-------------|-------------|-------------|-------------|
| Pro | nam Additiona | al | | | | | | | |
| Customer R | Customer Reference: B063793.002/ST/8479 | | | | | | | | |
| Soil
Miscellaneous | | Analysed | as Soil | | | | | | |
| | | | Concep | ot Reference | 656999 001 | 656999 002 | 656999 003 | 656999 004 | 656999 005 |
| | | Custon | ner Sampl | e Reference | WS08 | WS08 | WS12 | WS13 | RC03 |
| | | Depth | 3.00 | 4.00 | 2.00 | 3.85 | 8.00 | | |
| | | | Da | ate Sampled | 22-MAY-2017 | 22-MAY-2017 | 23-MAY-2017 | 23-MAY-2017 | 22-MAY-2017 |
| Determinand | erminand Method Test LOD Units | | | | | | | | |
| pН | T7 | A40 | | | 7.4 | 7.6 | 7.8 | 7.6 | 7.4 |
| SO4(2:1) | T6 | AR | 0.1 | g/l | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Moisture @105C | T162 | AR | 0.1 | % | 8.2 | 11 | 7.6 | 18 | 15 |

Concept Reference: 656999 Project Site: Kent Street Birmingham Additional Customer Reference: B063793.002/ST/8479

er Reference: B063793.002/S1/84/

Analysed as Soil

Soil Miscellane

| Miscellaneous | | | | | | |
|----------------|--------|----------------|--------|--------------|-------------|-------------|
| | | | Concep | ot Reference | 656999 006 | 656999 007 |
| | RC05 | RC01 | | | | |
| | | | | Depth | 6.00 | 6.00 |
| | | | Di | ate Sampled | 23-MAY-2017 | 22-MAY-2017 |
| Determinand | Method | Test
Sample | LOD | Units | | 1 |
| pН | T7 | A40 | | | 7.2 | 7.2 |
| SO4(2:1) | Т6 | AR | 0.1 | g/l | <0.1 | <0.1 |
| Moisture @105C | T162 | AR | 0.1 | % | 18 | 20 |

| Concept | 656999 | 383 | 1000 | | | | | | |
|-----------------------------|---------------|----------------------|-------------------|-----------------------------------|-------------|-------------|--|--|--|
| P | Project Site: | | | Kent Street Birmingham Additional | | | | | |
| Customer | B063793. | B063793.002/ST/8479 | | | | | | | |
| Soil
Particle Size | | Analysed | as Soil | | | | | | |
| | | | Concep | t Reference | 656999 006 | 656999 007 | | | |
| | | Custor | ner Sampl | e Reference | RC05 | RC01 | | | |
| | | | | Depth | 6.00 | 6.00 | | | |
| | | | Da | ate Sampled | 23-MAY-2017 | 22-MAY-2017 | | | |
| | | | | | | | | | |
| Determinand | Method | Test
Sample | LOD | Units | | | | | |
| Determinand
PSD (<63 um) | Method
T2 | Test
Sample
AR | LOD
0.1 | Units
% | Attached | Attached | | | |

Index to symbols used in 656999-1

| Value | Description |
|-------|---------------------------------|
| AR | As Received |
| A40 | Assisted dried < 40C |
| S | Analysis was subcontracted |
| U | Analysis is UKAS accredited |
| N | Analysis is not UKAS accredited |

Notes

PSD is subcontracted to PSL for analysis

Method Index

| Value | Description |
|-------|-------------|
| T7 | Probe |
| T2 | Grav |

| T162 | Grav (1 Dec) (105 C) |
|------|----------------------|
| T6 | ICP/OES |

| Determinand | Method | Test
Sample | LOD | Units | Symbol | Concept References |
|----------------|--------|----------------|-----|-------|--------|--------------------|
| PSD (<63 um) | T2 | AR | 0.1 | % | SN | 006-007 |
| PSD (>63 um) | T2 | AR | 0.1 | % | SN | 006-007 |
| pН | T7 | A40 | | | U | 001-007 |
| SO4(2:1) | T6 | AR | 0.1 | g/l | N | 001-007 |
| Moisture @105C | T162 | AR | 0.1 | % | N | 001-007 |





LABORATORY REPORT



4043

Contract Number: PSL17/2383

Report Date: 22 May 2017

Client's Reference:

Client Name: Geocore Site Investigations Ltd Tralee Close Kirkleatham Business Park Redcar Cleveland TS10 5SG

For the attention of : Bev Grace

| Contract Title: | Kent Street, Birmingham |
|--|-------------------------------------|
| Date Received:
Date Commenced:
Date Completed: | 19/5/2017
19/5/2017
22/5/2017 |
| | |

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director) R Berriman (Quality Manager)

£K#

L Knight (Senior Technician) S Eyre (Senior Technician) A Fry (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk Page 1 of

| Troressiona | | aboratory | | tel: 0844 8156641 . fax: 084
e-mail: awatkins@proso | | | | | |
|-------------------------------------|-----------------------------------|-----------------------------|--------------------|--|-----------------|----------------------|---------------|----------------|--|
| Independent La | boratory Tes | sting Services. | _ | | | e-ma | an: awatkins | @prosons.co.uk | |
| | | VERTI | CAL DEF
BS 1377 | FORMAT
: Part 9 : 19 | ION TES
190. | STS. | | | |
| Date of To | est: | 19-May-17 | | | | | | | |
| Test Posit | ion: | CBR01 | | Depth (m | n): GL | | | | |
| Plate Area | a (m2): | 0.2922467 | | Type of l | Kentledge: | Wheeled | | | |
| Maximun
Maximun
Descriptio | n Applied P
n Deformati
on: | ressure (kPa):
ion (mm): | | 154.62
0.44
Car park | x hardcore sa | indy GRAV | ÆL. | | |
| - | 180.00 T | | | | | | | 7 | |
| kPa | 160.00 | | | | | | * | _ | |
| -
- | 140.00 | | | | | | | - | |
| INSS | 120.00 | | | | | | | - | |
| Pre | 100.00 | | | | | | | - | |
| ing | 80.00 | | | | | | | - | |
| Beal | 60.00 + | | | | | | | - | |
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| Compiled By | Date | Checked B | y Dat | e App | roved By | Date | C | ontract No. | |
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| | | Kent Street | , Birmingh | am | | | Page | of | |

PSL

Professional Soils Laboratory

Professional Soils Laboratory

5 -7 Hexthorpe Road Hexthorpe Doncaster, DN4 0AG.



| Checked/ | Approved | Date | |
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| E | # | 22/05/17 | |
| Kont Street Birmingham | Contract N | 0. | |
| Kent Street, Dirmingham | PSL17/2383 | | |

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%

kN/m²/mm

| Professiona | I Soils La | boratory | | | tel: 08 | Doncaster, DN4 0AG.
44 8156641 . fax: 0844 8156642 |
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| Independent La | aboratory Test | ting Services. | | | e-ma | ail: awatkins@prosoils.co.uk |
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rt 9 : 1990. | TS. | |
| Date of T | est: | 19-May-17 | | | | |
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| | | Kent Street, Bir | mingham | | | Page of |

PSL

Professional Soils Laboratory

5 -7 Hexthorpe Road Hexthorpe



| | Checked/Approved | Date |
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| Kent Street, Birmingham | P | SL17/2383 |

| 110103310110 | | aboratory | | | tel: 084
e-ma | 44 8156641 . fax: 0844 8156642
iil: awatkins@prosoils.co.uk |
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| Independent La | boratory To | esting Services. | | | | |
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BS 1377 : Pa | RMATION TES
rt 9 : 1990. | STS. | |
| Date of Te | est: | 19-May-17 | | | | |
| Test Posit | ion: | CBR03 | 1 | Depth (m): GL | | |
| Plate Area | a (m2): | 0.2922467 |] | Type of Kentledge: | Wheeled | |
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| | | Kent Street, Bi | rmingham | | | Page of |

PSL

Professional Soils Laboratory

Professional Soils Laboratory

5 -7 Hexthorpe Road Hexthorpe Doncaster, DN4 0AG.



| | Checked/Approved | Date |
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| | £K# | 22/05/17 |
| | Contract No. | |
| Kent Street, Birmingham | Р | SL17/2383 |

| Independent La | boratory To | esting Services. | | | tel: 08
e-ma | 44 8156641 . fax: 0844 815664
ail: awatkins@prosoils.co.uk |
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BS 1377 : P | RMATION TES
art 9 : 1990. | STS. | |
| Date of Te | est: | 19-May-17 | | | | |
| Test Posit | ion: | CBR04 | | Depth (m): GL | | |
| Plate Area | a (m2): | 0.2922467 | | Type of Kentledge: | Wheeled | |
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| | | Kent Street, Bir | rmingham | | | Page of |

Professional Soils Laboratory 5 -7 Hexthorpe Road Hexthorpe Doncaster, DN4 0AG. el: 0844 8156641 . fax: 0844 8156642 e-mail: awatkins@prosoils.co.uk

PSL Professional Soils Laboratory



| Checked | /Approved | Date |
|-------------------------|------------|--------------------|
| £ | Kµ- | 22/05/17 |
| Kent Street, Birmingham | Contract I | No.
PSL 17/2383 |
| | - | 521772000 |

| Date of Test: | 19-May-17 | | | | | |
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| Test Position: | CBR05 | | Depth (m): GL | | | |
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Professional Soils Laboratory 5 -7 Hexthorpe Road Hexthorpe Doncaster, DN4 0AG. tel: 0844 8156641 . fax: 0844 8156642 e-mail: awatkins@prosoils.co.uk

Independent Laboratory Testing Service

PSL

Professional Soils Laboratory



| | Checked/Approved | Date |
|-------------------------|------------------|-------------------|
| | £K# | 22/05/17 |
| Kent Street, Birmingham | Contract N
P | No.
PSL17/2383 |



LABORATORY REPORT



4043

Contract Number: PSL17/2511

Report Date: 13 June 2017

Client's Reference:

Client Name: Concept Life Sciences Hadfield House Old Trafford Manchester M16 9FE

For the attention of: Bianca Prince

| Contract Title: | 655806 |
|-----------------|-----------|
| Date Received: | 30/5/2017 |
| Date Commenced: | 30/5/2017 |
| Date Completed: | 13/6/2017 |

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director) R Berriman (Quality Manager)

L Knight (Senior Technician) S Eyre (Senior Technician)

A Fry (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

| Hole
Number | Sample
Number | Sample
Type | Top
Depth
m | Base
Depth
m | Description of Sample |
|----------------|------------------|----------------|-------------------|--------------------|---|
| TP01 | 7 | | 1.00 | | MADE GROUND brown very gravelly silty sand. |
| TP03 | 9 | | 1.50 | | MADE GROUND brown very sandy slightly clayey silty gravel . |
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| | 655806 | Contract No: |
|------------------------------------|--------|---------------------|
| | | PSL17/2511 |
| | | Client Ref: |
| 4043 Professional Solis Laboratory | | |

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2


PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4





LABORATORY REPORT



4043

Contract Number: PSL17/2608

Report Date: 27 June 2017

Client's Reference:

Client Name: SAL Hadfield House Old Trafford Manchester M16 9FE

For the attention of: Bianca Prince

| Contract Title: | 656999 |
|-----------------|----------|
| Date Received: | 5/6/2017 |
| Date Commenced: | 5/6/2017 |
| Date Completed: | 7/6/2017 |

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director) R Berriman (Quality Manager)

AP

L Knight (Senior Technician) S Eyre (Senior Technician) A Fry (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

| Sample
Date | Sample
Number | Sample
Type | Top
Depth
m | Hole
Number | Description of Sample |
|----------------|------------------|----------------|-------------------|----------------|---|
| 23/5/2017 | 6 | D | 6.00 | RC05 | Reddish brown gravelly slightly clayey silty SAND. |
| 22/5/2017 | 7 | D | 6.00 | RC01 | Brown slightly gravelly slightly clayey silty SAND. |
| | | | | | |
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| dia | | | Contract No: |
|------|-------------------------------|--------|--------------|
| | PSL | 656000 | PSL17/2608 |
| | Professional Sails Laboratory | 030777 | Client Ref: |
| 4043 | Professional Solis Laboratory | | |

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4



PSL005

of

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4



of

063793-CUR-00-XX-RP-GE-00001

Former Kent Street Baths, Birmingham



Phase 2 Site Investigation

Appendix A5 – Ground Gas and Groundwater Monitoring Results



GAS MONITORING LOG SHEET

| Barometric State: | Falling | Ground Conditions | Wet |
|-------------------|-------------------------------|-------------------|----------|
| Client: | Camborne Land Investments Ltd | Weather: | Cloudy |
| Job Number: | B063793.002 | Visit: | 1 |
| Project: | Kent Street, Birmingham | Date: | 06/06/17 |

| Borehole
Reference | Barometric
Pressure | Flo | w | Meth | Methane Carbon
Dioxide | | Oxygen | Hydrogen
Sulphide | Carbon
Monoxide | Water
Level | Note | |
|-----------------------|------------------------|-----|-----|------|---------------------------|-----|--------|----------------------|--------------------|----------------|-------|---|
| | mb | 1/1 | ٦r | 9 | 6 | 9 | 6 | % | ppm | ppm | m bgl | |
| | | Max | SS | Max | SS | Max | SS | | | | | |
| WS08 | 988 | 0.0 | 0.0 | 0.0 | 0.0 | 2.3 | 2.3 | 16.8 | 2 | 0 | Dry | |
| WS11 | 988 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 17.3 | 1 | 0 | Dry | |
| WS12 | 988 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 2.0 | 17.1 | 2 | 0 | Dry | |
| WS13B | 987 | 0.0 | 0.0 | 0.0 | 0.0 | 5.7 | 4.5 | 15.5 | 2 | 0 | Dry | |
| RC01 | 987 | 0.0 | 0.0 | 0.0 | 0.0 | 5.2 | 5.2 | 11.2 | 1 | 0 | 3.70 | |
| RC02 | 989 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 19.7 | 0 | 0 | 3.65 | |
| RC03 | | | | | | | | | | | | 1 |
| RC04 | 987 | 0.0 | 0.0 | 0.0 | 0.0 | 2.2 | 2.2 | 11.6 | 2 | 0 | 3.65 | |
| RC05 | 987 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.4 | 1 | 0 | 4.10 | |
| | | | | | | | | | | | | |
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Notes

Logged by

1 - Car parked over borehole location

1% gas volume = 10,000 ppm

Curtins Consulting 2 The Wharf, Bridge Street, Birmingham, B1 2JS Tel: 0121 643 4694 Fax: 0161 228 7902



GAS MONITORING LOG SHEET

| Project: | Kent Street, Birmingham | Date: | 13/06/17 |
|-------------------|-------------------------------|--------------------|----------|
| Job Number: | B063793.002 | Visit: | 2 |
| Client: | Camborne Land Investments Ltd | Weather: | Cloudy |
| Barometric State: | Falling | Ground Conditions: | Dry |

| Borehole
Reference | Barometric
Pressure | Flo | w | Methane Carbon
Dioxide | | Oxygen | Hydrogen
Sulphide | Carbon
Monoxide | Water
Level | Note | | |
|-----------------------|------------------------|-----|-----|---------------------------|-----|--------|----------------------|--------------------|----------------|------|-------|--|
| | dm | 1/1 | nr | ÿ | ′o | 7 | ⁄o | % | ррт | ppm | m bgi | |
| | | Max | SS | Max | SS | Max | SS | | | | | |
| WS08 | 1006 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 2.5 | 16.6 | 2 | 0 | Dry | |
| WS11 | 1007 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.8 | 2 | 0 | Dry | |
| WS12 | 1005 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 2.0 | 18.1 | 1 | 0 | Dry | |
| WS13B | 1006 | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 | 0.3 | 20.5 | 1 | 0 | Dry | |
| RC01 | 1005 | 0.0 | 0.0 | 0.0 | 0.0 | 7.2 | 7.2 | 8.6 | 0 | 0 | 3.70 | |
| RC02 | 1007 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 20.0 | 2 | 4 | 3.70 | |
| RC03 | 1006 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.8 | 2 | 0 | 4.15 | |
| RC04 | 1006 | 0.0 | 0.0 | 0.0 | 0.0 | 3.1 | 3.1 | 10.1 | 2 | 1 | 3.70 | |
| RC05 | 1006 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 1.0 | 14.5 | 1 | 1 | 4.05 | |
| | | | | | | | | | | | | |
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Notes

Logged by

RS

1% gas volume = 10,000 ppm

Curtins Consulting 2 The Wharf, Bridge Street, Birmingham, B1 2JS Tel: 0121 643 4694 Fax: 0161 228 7902



GAS MONITORING LOG SHEET

| Project: | Kent Street, Birmingham | Date: | 22/06/17 |
|-------------------|-------------------------------|--------------------|----------|
| Job Number: | B063793.002 | Visit: | 3 |
| Client: | Camborne Land Investments Ltd | Weather: | Cloudy |
| Barometric State: | Falling | Ground Conditions: | Dry |

| Borehole
Reference | Barometric
Pressure | Flo | ow | Metl | Methane Carbon
Dioxide | | Oxygen | Hydrogen
Sulphide | Carbon
Monoxide | Water
Level | Note | |
|-----------------------|------------------------|-----|-----|------|---------------------------|-----|--|----------------------|--------------------|----------------|-------|--|
| | diff | Max | | Mox | ° | Mox | ~
~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ | 70 | ррш | ppin | in by | |
| WS08 | 995 | 0.0 | 0.0 | 0.0 | 0.0 | 1.4 | 1.4 | 18.5 | 3 | 0 | Dry | |
| WS11 | 995 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.2 | 0 | 1 | Dry | |
| WS12 | 995 | 0.0 | 0.0 | 0.0 | 0.0 | 2.4 | 2.4 | 18.0 | 2 | 0 | Dry | |
| WS13B | 995 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 | 0.9 | 19.5 | 1 | 0 | Dry | |
| RC01 | 995 | 0.0 | 0.0 | 0.0 | 0.0 | 6.7 | 6.7 | 8.6 | 1 | 1 | 3.80 | |
| RC02 | 997 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.3 | 20.5 | 2 | 2 | 3.70 | |
| RC03 | 995 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.2 | 2 | 0 | 4.20 | |
| RC04 | 995 | 0.0 | 0.0 | 0.0 | 0.0 | 3.9 | 3.9 | 8.4 | 2 | 1 | 3.75 | |
| RC05 | 995 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.7 | 1 | 0 | 4.10 | |
| | | | | | | | | | | | | |
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Notes

Logged by

RS

1% gas volume = 10,000 ppm

Curtins Consulting

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GAS MONITORING LOG SHEET

| Project: | Kent Street, Birmingham | Date: | 29/06/17 |
|-------------------|-------------------------------|-------------------|-------------------------|
| Job Number: | B063793.002 | Visit: | 4 |
| Client: | Camborne Land Investments Ltd | Weather: | Overcast, Light Drizzle |
| Barometric State: | Stable | Ground Conditions | Damp |

| Borehole
Reference | Barometric
Pressure | Fle | w | Methane | | Carbon
Dioxide | | Oxygen | Hydrogen
Sulphide | Carbon
Monoxide | Water
Level | Note |
|-----------------------|------------------------|-----|-----|---------|-----|-------------------|-----|--------|----------------------|--------------------|----------------|--|
| | mb | I/I | hr | 9 | 6 | 9 | 6 | % | ppm | ppm | m bgl | , in the second se |
| | | Max | SS | Max | SS | Max | SS | | | | | |
| WS08 | 987 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 18.7 | 0 | 0 | 3.73 | |
| WS11 | 987 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 18.5 | 0 | 0 | DRY | |
| WS12 | 988 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 1.2 | 18.7 | 0 | 0 | DRY | |
| WS13B | 988 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 20.5 | 0 | 2 | DRY | |
| RC01 | 988 | 0.0 | 0.0 | 0.0 | 0.0 | 8.5 | 8.5 | 6.9 | 0 | 0 | 3.71 | |
| RC02 | 988 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.3 | 19.7 | 1 | 1 | 3.70 | |
| RC03 | 988 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.2 | 20.4 | 0 | 1 | 4.15 | |
| RC04 | 988 | 0.0 | 0.0 | 0.0 | 0.0 | 4.3 | 4.3 | 7.9 | 0 | 1 | 3.69 | |
| RC05 | 988 | N/A | N/A | 0.0 | 0.0 | 0.6 | 0.6 | 18.5 | 1 | 0 | 4.08 | 1 |
| | | | | | | | | | | | | |
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Notes

Logged by

1- RC05 - Location flooded at surface, bung removed to drain water. Thus no flow available.

1% gas volume = 10,000 ppm

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Curtins

GAS MONITORING LOG SHEET

| Project: | Kent Street, Birmingham | Date: | 07/07/2017 |
|---------------------|-------------------------------|-------------------|----------------------|
| Job Number: | B063793.002 | Visit: | 5 |
| Client: | Camborne Land Investments Ltd | Weather: | Sunny, Hot, 0% Cloud |
| Barometric S Stable | Steady | Ground Conditions | Dry |

| Borehole
Reference | Barometric
Pressure | Flo | w | Meth | nane | Car
Dio | bon
kide | Oxygen | Hydrogen
Sulphide | Carbon
Monoxide | Water
Level | Note |
|-----------------------|------------------------|-------|-----|------|------|------------|-------------|--------|----------------------|--------------------|----------------|------|
| | mb | l/ł | nr | 9 | 6 | 9 | 6 | % | ppm | ppm | m bgl | , v |
| | | Max | SS | Max | SS | Max | SS | | | | | |
| WS08 | 1002 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.9 | 19.4 | 1 | 0 | DRY | |
| WS11 | | | | | | | | | | | | 1 |
| WS12 | 1002 | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 | 0.7 | 20.4 | 0 | 0 | DRY | |
| WS13B | 1002 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.2 | 20.7 | 1 | 0 | DRY | |
| RC01 | 1002 | 0.0 | 0.0 | 0.0 | 0.0 | 8.3 | 8.3 | 5.8 | 1 | 0 | 3.56 | |
| RC02 | 1002 | -13.3 | 0.0 | 0.0 | 0.0 | 0.3 | 0.3 | 20.4 | 1 | 1 | 4.80 | |
| RC03 | 1002 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.9 | 0 | 0 | 5.73 | |
| RC04 | 1002 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.2 | 20.4 | 0 | 0 | 4.74 | |
| RC05 | 1002 | -0.1 | 0.0 | 0.0 | 0.0 | 2.6 | 2.6 | 12.1 | 0 | 0 | 5.15 | |
| | | | | | | | | | | | | |
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Notes

Logged by

1. WS11 Car over location. Unable to access.

1% gas volume = 10,000 ppm

Curtins Consulting 2 The Wharf, Bridge Street, Birmingham, B1 2JS Tel: 0121 643 4694 Fax: 0161 228 7902



GAS MONITORING LOG SHEET

| Barometric State: | Stable | Ground Conditions: | Dry |
|-------------------|-------------------------------|--------------------|----------------|
| Client: | Camborne Land Investments Ltd | Weather: | Overcast, Warm |
| Job Number: | B063793.002 | Visit: | 6 |
| Project: | Kent Street, Birmingham | Date: | 14/07/2017 |

| Borehole
Reference | Barometric
Pressure | Fle | w | Meth | nane | Car
Dio: | bon
xide | Oxygen | Hydrogen
Sulphide | Carbon
Monoxide | Water
Level | Note |
|-----------------------|------------------------|-------|-----|------|------|-------------|-------------|--------|----------------------|--------------------|----------------|------|
| | mb | I/I | nr | 9 | 6 | 9 | 6 | % | ppm | ppm | m bgl | (U |
| | | Max | SS | Max | SS | Max | SS | | | | | |
| WS08 | 1008 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 19.6 | 0 | 0 | N/A | 1 |
| WS11 | 1008 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 18.4 | 1 | 1 | N/A | 1 |
| WS12 | | | | | | | | | | | | 1/2 |
| WS13B | 1008 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.4 | 20.0 | 0 | 0 | N/A | 1 |
| RC01 | 1008 | 0.0 | 0.0 | 0.0 | 0.0 | 10.6 | 10.6 | 4.0 | 0 | 0 | N/A | 1 |
| RC02 | 1008 | -17.2 | 0.0 | 0.0 | 0.0 | 0.3 | 0.3 | 20.2 | 1 | 1 | N/A | 1 |
| RC03 | 1008 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.8 | 0 | 1 | N/A | 1 |
| RC04 | 1008 | 0.0 | 0.0 | 0.0 | 0.0 | 4.0 | 4.0 | 9.5 | 0 | 0 | N/A | 1 |
| RC05 | | - | | - | | - | | | - | | | 1/3 |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
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Notes Logged by 1 Dip meter equipment malfunction unable to obtain water depth measurements. ST 2 Area obstructed by construction compound. ST 3 Area obsutrcuted by vehicle.

1% gas volume = 10,000 ppm

063793-CUR-00-XX-RP-GE-00001

Former Kent Street Baths, Birmingham

Phase 2 Site Investigation



Appendix A6 – Tier 1 Screening Thresholds

Adopted Soil Generic Assessment Criteria Sandy loam with 6% SOM



| Contaminants | Residential with | Residential without | Allotments | Commercial | Public open space | Public park |
|--|-----------------------------|-------------------------------|-----------------------------|------------------------------------|---|------------------------------------|
| | home grown | home grown | | | near residential | POSpark |
| | produce | produce | | | nousing POS _{resi} | |
| Metals | | | | | | |
| Beryllium | 1.7 | 1.7 | 35 | 12 | 2.2 | 63 |
| Boron | 290 | 11,000 | 45 | 240,000 | 21,000 | 46,000 |
| Cadmium | 10 ⁽¹⁰ <u>22</u> | 85 ⁽¹⁰⁾ <u>150</u> | 1.8 <u>3.9</u> | 230 <u>410</u> | 120 <u>220</u> | 560 <u>880</u> |
| Chromium III | 910 | 910 | 18,000 | 8,600 | 1,500 | 33,000 |
| | 6 <u>21</u> | 6 <u>21</u> | 1.8 <u>170</u> | 33 <u>49</u> | 7.7 <u>21</u> | 220 250 |
| | 200 | 310 | 80 | 2,300 | <u>630</u> | <u>1,300</u> |
| Mercury (elemental) | 1 | 1 | 26 | 26 | 16 | 26 ⁽⁰ [30] |
| Mercury (Inorganic) | 170 | 240 | 80 | 3600 | 120 | 240 |
| Nickel | 130 (10 | 180(10 | 53 | 980 | 230 | 800 |
| Vanadium | 410 | 1200 | 91 | 9000 | 2000 | 5000 |
| Copper | 2400 | 7100 | 520 | 58000 | 12000 | 44000 |
| Semi-Metals and non-metals | 3700 | 40000 | 020 | 730000 | 81000 | 170000 |
| | 32 ⁽¹² 37 | 35(12 40 | 43 ⁽¹² 49 | 640 ⁽¹² 640 | 79 79 | 170 170 |
| Antimony | <u> 32</u> <u>37</u> | 550 | 40 <u>40</u> | 7500 | 1500 | 3300 |
| Selenium | 350 | 600 | 120 | 13000 | 1100 | 1800 |
| Inorganic chemicals | | | | | 1100 | 1000 |
| Cyanide | 34 | 34 | 34 | 34 | 34 | 34 |
| Organic contaminants | | | | | | |
| Aliphatic risk banded hydrocarbons - TPHCWG method | | | | | | |
| $EC_{>5} - EC_6$ | 160 | 160 | 3900 | 12000 | 600000 | 180000 |
| EC _{>6} - EC ₈ | 530 | 530 | 13000 | 40000 | 620000 | 320000 |
| EC _{>8} - EC ₁₀ | 150 | 150 | 1700 | 11000 | 13000 | 21000 |
| EC ₁₀ -EC ₁₂ | 760 | 770 | 7300 | 47000 | 13000 | 24000 |
| EC ₁₂ -EC ₁₆ | 4300 | 4400 | 13000 | 90000 | 13000 | 26000 |
| EC _{>16} - EC ₃₅ | 110000 | 110000 | 270000 | 1800000 | 250000 | 490000 |
| EC>35 - EC44 | 110000 | 110000 | 270000 | 1800000 | 250000 | 490000 |
| Aromatic risk banded hydrocarbons - TPHCWG method | | | | | | |
| $EC_{5} - EC_{7}$ | 300 | 1400 | 57 | 86000 | 56000 | 92000 |
| EC>7 - EC8 | 660 | 3900 | 120 | 180000 | 56000 | 100000 |
| $EC_{>8} - EC_{10}$ | 190 | 270 | 51 | 17000 | 5000 | 9300 |
| EC ₁₀ - EC ₁₂ | 380 | 1200 | 74 | 34000 | 5000 | 10000 |
| EC ₁₂ - EC ₁₆ | 660 | 2500 | 130 | 38000 | 5000 | 10000 |
| EC _{>16} - EC ₂₁ | 930 | 1900 | 260 | 28000 | 3800 | 7800 |
| EC _{>21} - EC ₃₅ | 1700 | 1900 | 1600 | 28000 | 3800 | 7900 |
| EC> ₃₅ - EC ₄₄ | 1700 | 1900 | 1600 | 28000 | 3800 | 7900 |
| | 1000 | 4000 | 0000 | | 0000 | 7000 |
| Aliph + Arom EC >44-70 | 1900 | 1900 | 3000 | 28000 | 3800 | 7900 |
| Benzene | 0.33 0.87 | 1.0 3.3 | 0.07 0.18 | 95 98 | 73 140 | 110 230 |
| Ethyl benzene | 350 | 840 | 90 | 2800 ⁽⁸ [66000] | 2800 ⁽⁸ [25000] | 2800 ⁽⁸ [27000] |
| Toluene | 610 | 2700 | 120 | 4400 ⁽⁸ [190000] | 4400 ⁽⁸ [56000] | 4400 ⁽⁸ [100000] |
| Yulopo ⁽⁹ | 220 | 200 | 160 | 1000001] 00000 | 2600 ⁽⁸ [42000] | 2600 ⁽⁸ [21000] |
| Phonol | 420 | 500 | 280 | 3200 ⁽¹⁴ (38000) | 2000 [40000]
2000 ⁽¹⁴ (10000) | 3200 ⁽¹⁴ (0200) |
| Polycyclic Aromatic Hydrocarbons (PAH) | 420 | 520 | 200 | 3200 (00000) | 3200 (10000) | 3200 (3300) |
| Naphthalene | 13 | 13 | 24 | 1100 | 4900 | 3000 |
| Acenaphthylene | 920 | 6000 | 160 | 100000 | 15000 | 30000 |
| Acenaphthene | 1100 | 6000 | 200 | 100000 | 15000 | 30000 |
| Fluorene | 860 | 4500 | 160 | 71000 | 9900 | 20000 |
| Phenanthrene | 440 | 1500 | 90 | 23000 | 3100 | 6300 |
| Anthracene | 11000 | 37000 | 2200 | 540000 | 74000 | 150000 |
| Fluoranthene | 890 | 1600 | 290 | 23000 | 3100 | 6400 |
| Pyrene
Renz(a)anthropping | 2000 | 3800 | 620 | 54000 | 7400 | 15000 |
| Chrysene | 27 | 32 | 13 | 350 | 29 | 120 |
| Benzo(b)fluoranthene | 37 | 4 0 | 39 | 45 | 72 | 16.0 |
| Benzo(k)fluoranthene | 100 | 110 | 130 | 1200 | 190 | 440 |
| Benzo(a)pyrene | 3.0 5.0 | 3.2 5.3 | 3.5 5.7 | 36 77 | 5.7 10 | <i>13</i> 21 |
| Indeno(123cd)pyrene | 41 | 46 | 39 | 510 | 82 | 180 |
| Dibenzo(ah)anthracene | 0.3 | 0.32 | 0.43 | 3.6 | 0.58 | 1.4 |
| Benzo(ghi)perylene | 350 | 360 | 640 | 4000 | 640 | 1600 |
| Chlorinated Aliphatic Hydrocarbons | | | | | | |
| Vinyl chloride | 0.0014 | 0.0015 | 0.0018 | 0.12 | 3.5 | 5.4 |
| 1 1 1 2 Tetrachlerathana | 0.075 | 0.08 | 0.21 | 5.7 | 120 | 120 |
| Tetrachlorethene (PCE) | 0.4 | 0.2
0.02 | 4.4
3 G | 95U
95 | 1400 | 2100
1500 |
| 1.1.1 Trichlorethane | 3.9 | 40 | 240 | 3000 | 140000 | 100000 |

Notes 1. All values above are in mg/kg

2. Numbers in bold are SCVs or GAC that are derived based on SGV report input parameters, numbers in italics are S4ULs, numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters and underlined numbers are C4SLs

3. Soil organic matter (SOM) is assumed to be 6% - DEFAULT VALUE

4. Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE

5. For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model

6. For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly 7. For classrooms consider increasing the dust loading fator in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m⁻³

8. Based on vapour saturation limt as suggested by EA / [] model value

9. Lowest of o-, m- and p-xylene

10. Based on comparison of inhalation exposure with inhalation TDI

11. Based on comparison of oral, dermal, and inhalation exposure with the oral TDI

12. Based on a comparison of oral and dermal soil exposure with oral Index Dose only

13. Averaged over and based on lifetime exposure

14. Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)

15. NA: Not applicable

Adopted Soil Generic Assessment Criteria Sandy loam with 2.5% SOM



| Contaminants | Residential with | Residential without | Allotments | Commercial | Public open space | Public park |
|--|----------------------|------------------------------|---------------------|-----------------------------|-----------------------------|--|
| | home grown | home grown | | | near residential | POSpark |
| | produce | produce | | | housing POS _{resi} | P.0 |
| Metals | | | | | | |
| Beryllium | 1.7 | 1.7 | 35 | 12 | 2.2 | 63 |
| Boron | 290 | 11,000 | 45 | 240,000 | 21,000 | 46,000 |
| Cadmium | 10 ⁽¹³ 22 | 85 ⁽¹³ <u>150</u> | 1.8 <u>3.9</u> | 230 <u>410</u> | 120 <u>220</u> | 560 <u>880</u> |
| Chromium III | 910 | 910 | 18,000 | 8,600 | 1,500 | 33,000 |
| Chromium VI | 6 <u>21</u> | 6 <u>21</u> | 1.8 <u>170</u> | <i>33</i> <u>49</u> | 7.7 <u>21</u> | 220 <u>250</u> |
| Lead | 200 | <u>310</u> | <u>80</u> | 2,300 | <u>630</u> | <u>1.300</u> |
| Mercury (elemental) | 1 | 1 | 26 | 26 | 16 | 26 ⁽⁸ [30] |
| Mercury (inorganic) | 170 | 240 | 80 | 3600 | 120 | 240 |
| Niekol | 120(10 | 180(10 | 52 ⁽¹¹ | 080 ⁽¹⁰ | 220 | 200 |
| Nickei | 130 | 100 | 01 | 900 | 230 | 5000 |
| Coppor | 2400 | 7100 | 520 | 9000
68000 | 2000 | 44000 |
| Zinc | 3700 | 100 | 620 | 730000 | 81000 | 170000 |
| Semi-Metals and non-metals | 5700 | 40000 | 020 | 700000 | 07000 | 170000 |
| | 20(12 07 | 25(12 40 | 42(12 40 | C10 ⁽¹² C10 | 70 70 | 170 170 |
| Arsenic | 32 <u>37</u> | 35 <u>40</u> | 43 <u>49</u> | 640 <u>640</u> | 79 <u>79</u> | 170 <u>170</u> |
| Solonium | 350 | 500 | 120 | 12000 | 1100 | 1800 |
| | 330 | 000 | 120 | 13000 | 1100 | 1800 |
| Cvanide | 34 | 34 | 34 | 34 | 34 | 34 |
| Organic contaminants | 01 | 04 | 04 | 01 | 01 | 04 |
| Aliphatic risk banded hydrocarbons - TPHCWG method | | | | | | |
| EC. = - EC. | 78 | 78 | 1700 | 5900 | 590000 | 130000 |
| ================================= | 230 | 230 | 5600 | 17000 | 610000 | 220000 |
| EC = EC | 65 | 65 | 770 | 4800 | 13000 | 18000 |
| | 320 | 220 | 1100 | 22000 | 13000 | 22000 |
| | 330 | 330 | 4400 | 23000 | 13000 | 23000 |
| | 2400 | 2400 | 13000 | 82000 | 13000 | 25000 |
| EC _{>16} - EC ₃₅ | 92000 | 92000 | 270000 | 1700000 | 250000 | 480000 |
| EC>35 - EC44 | 92000 | 92000 | 270000 | 1700000 | 250000 | 480000 |
| Aromatic risk banded hydrocarbons - TPHCWG method | | | | | | |
| $EC_{5} - EC_{7}$ | 140 | 690 | 27 | 46000 | 56000 | 84000 |
| EC>7 - EC8 | 290 | 1800 | 51 | 110000 | 56000 | 95000 |
| EC _{>8} - EC ₁₀ | 83 | 110 | 21 | 8100 | 5000 | 8500 |
| EC ₁₀ - EC ₁₂ | 180 | 590 | 31 | 28000 | 5000 | 9700 |
| EC12 - EC16 | 330 | 2300 | 57 | 37000 | 5100 | 10000 |
| EC-16 - EC21 | 540 | 1900 | 110 | 28000 | 3800 | 7700 |
| EC ₂₂₁ - EC ₂₅ | 1500 | 1900 | 820 | 28000 | 3800 | 7800 |
| $EC_{>_{35}} - EC_{44}$ | 1500 | 1900 | 820 | 28000 | 3800 | 7800 |
| | | | | | | |
| Aliph + Arom EC >44-70 | 1800 | 1900 | 2100 | 28000 | 3800 | 7800 |
| Aromatic | | | | | | |
| Benzene | 0.16 | 0.49 | 0.035 | 50 | 72 | 100 |
| Ethyl benzene | 150 | 380 | 39 | 1200 ⁽⁸ [35000] | 1200 ⁽⁸ [24000] | 1200 ⁽⁸ [22000] |
| Toluene | 270 | 1300 | 51 | 1900 ⁽⁸ [110000] | 1900 ⁽⁸ [56000] | 1900 ⁽⁸ [<i>95000</i>] |
| Xvlene ⁽⁹ | 98 | 120 | 70 | 1200 ⁽⁸ [14000] | 1200 ⁽⁸ [42000] | 1200 ⁽⁸ [23000] |
| Phonol | 200 | /20 | 140 | 1500 ⁽¹⁴ (35000) | 1500 ⁽¹⁴ (10000) | 1500 ⁽¹⁴ (8300) |
| Polycyclic Aromatic Hydrocarbons (PAH) | 290 | 420 | 140 | (00000) | 1300 (10000) | 1300 (0000) |
| Naphthalene | 56 | 5.6 | 10 | 460 | 4900 | 1900 |
| Acenaphthylene | 420 | 4600 | 69 | 97000 | 15000 | 30000 |
| Acenaphthene | 510 | 4700 | 85 | 97000 | 15000 | 30000 |
| Fluorene | 400 | 3800 | 67 | 68000 | 9900 | 20000 |
| Phenanthrene | 220 | 1500 | 38 | 22000 | 3100 | 6200 |
| Anthracene | 5400 | 35000 | 950 | 540000 | 74000 | 150000 |
| Fluoranthene | 560 | 1600 | 130 | 23000 | 3100 | 6300 |
| Pyrene | 1200 | 3800 | 270 | 54000 | 7400 | 15000 |
| Benz(a)anthracene | 11 | 14 | 6.5 | 170 | 29 | 56 |
| Chrysene | 22 | 31 | 9.4 | 350 | 57 | 110 |
| Benzo(b)fluoranthene | 3.3 | 4.0 | 2.1 | 44 | 1.2 | 15 |
| Benzo(K)fluoranthene | 93 | 110 | 75 | 1200 | 190 | 410 |
| Benzo(a)pyrene | 2.7 | 3.2 | 2 | 35 | 5.7 | 12 |
| Indeno(123cd)pyrene | 36 | 46 | 21 | 510 | 82 | 1/0 |
| Diberizo(an)anthracene | 0.28 | 0.32 | 0.27 | 3.6 | 0.57 | 1.3 |
| Chlorinated Alinhatic Hydrocerhone | 340 | 300 | 470 | 4000 | 040 | 1500 |
| Vinvl chloride | 0.00087 | 0.001 | 0.001 | 0.077 | 35 | 5 |
| Trichloroethene (TCE) | 0.034 | 0.036 | 0.091 | 26 | 120 | .91 |
| 1.1.1.2 Tetrachlorethane | 28 | 3.5 | 1.9 | 250 | 1400 | 1800 |
| Tetrachlorethene (PCE) | 0.39 | 0.4 | 1.5 | 42 | 1400 | 1100 |
| 1 1 1 Trichlorethane | 18 | 18 | 110 | 1300 | 140000 | 76000 |

Notes

1. All values above are in mg/kg

Numbers in bold are SQVs or GAC that are derived based on SQV report input parameters, numbers in italics are S4ULs, numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters and underlined numbers are C4SLs
 Soil organic matter (SOM) is assumed to be 2.5% - DEFAULT VALUE

4. Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE

5. For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model

6. For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly

7. For classrooms consider increasing the dust loading fator in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m⁻³

8. Based on vapour saturation limt as suggested by EA / [] model value

9. Lowest of o-, m- and p-xylene

10. Based on comparison of inhalation exposure with inhalation TDI

11. Based on comparison of oral, dermal, and inhalation exposure with the oral TDI

12. Based on a comparison of oral and dermal soil exposure with oral Index Dose only

13. Averaged over and based on lifetime exposure

14. Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)

15. NA: Not applicable

Adopted Soil Generic Assessment Criteria Sandy loam with 1% SOM



| Contaminants | Residential with | Residential without | Allotments | Commercial | Public open space | Public park |
|--|-------------------------|------------------------------------|-------------------------|--------------------------------------|-----------------------------------|----------------------------------|
| | home grown | home grown | | | near residential | POSpark |
| | produce | produce | | | housing POS _{resi} | |
| Metals | | | | | | |
| Beryllium | 1.7 | 1.7 | 35 | 12 | 2.2 | 63 |
| Boron | 290 | 11,000 | 45 | 240,000 | 21,000 | 46,000 |
| Cadmium | 10 ⁽¹³ 22 | 85 ⁽¹³ 150 | 1.8 3.9 | 230 410 | 120 <u>220</u> | 560 <u>880</u> |
| Chromium III | 910 | 910 | 18.000 | 8.600 | 1.500 | 33.000 |
| Chromium VI | 6 21 | 6 21 | 1.8 170 | 33 49 | 7.7 21 | 220 250 |
| Lead | 200 | 310 | 80 | 2,300 | 630 | 1,300 |
| Mercury (elemental) | 1 | 1 | 26 | 26 | 16 | 26 ⁽⁸ [30] |
| Mercury (inorganic) | 170 | 240 | 80 | 3600 | 120 | 240 |
| | 110 | 240 | | 3000 | 120 | 240 |
| Nickel | 130 | 180 | 53 | 980 | 230 | 800 |
| Vanadium | 410 | 1200 | 91 | 9000 | 2000 | 5000 |
| Copper | 2400 | /100 | 520 | 68000 | 12000 | 44000 |
| Zinc
Comi Matala and nan matala | 3700 | 40000 | 620 | 730000 | 81000 | 170000 |
| Semi-ivietais and non-metais | aa/12 am | | 12 (12) (12) | a aa/12 a ka | | |
| Arsenic | 32 (12 <u>37</u> | 35 ⁽¹² <u>40</u> | 43 (12 <u>49</u> | 640 ¹¹² <u>640</u> | 79 <u>79</u> | <i>170 <u>170</u></i> |
| Antimony | | 550 | | 7500 | 1500 | 3300 |
| Selenium | 350 | 600 | 120 | 13000 | 1100 | 1800 |
| Inorganic chemicals | | | | | 24 | |
| | 34 | 34 | 34 | 34 | 34 | 34 |
| Organic contaminants | | | | | | |
| Alipnatic risk banded hydrocarbons - TPHCWG method | 10 | | | | | |
| $EG_{>5} - EG_6$ | 42 | 42 | 730 | 3200 | 570000 | 95000 |
| EC _{>6} - EC ₈ | 100 | 100 | 2300 | 7800 | 600000 | 150000 |
| EC _{>8} - EC ₁₀ | 27 | 27 | 320 | 2000 | 13000 | 14000 |
| EC10-EC12 | 130 | 130 | 2200 | 9700 | 13000 | 21000 |
| EC12-EC16 | 1100 | 1100 | 11000 | 59000 | 13000 | 25000 |
| FC to - FCor | 65000 | 65000 | 260000 | 1600000 | 250000 | 450000 |
| $EC_{>0} = EC_{44}$ | 65000 | 65000 | 260000 | 1600000 | 250000 | 450000 |
| Aromatic risk handed hydrocarbons - TPHCWG method | 00000 | 00000 | 200000 | 1000000 | 200000 | 400000 |
| | 70 | 370 | 12 | 26000 | 56000 | 76000 |
| | 100 | 370 | 10 | 20000 | 50000 | 70000 |
| $EO_{7} - EO_{8}$ | 130 | 860 | 22 | 36000 | 56000 | 87000 |
| $EC_{>8} - EC_{10}$ | 34 | 4/ | 8.6 | 3500 | 5000 | 7200 |
| EC ₁₀ - EC ₁₂ | 74 | 250 | 13 | 16000 | 5000 | 9200 |
| EC ₁₂ - EC ₁₆ | 140 | 1800 | 23 | 36000 | 5100 | 10000 |
| EC _{>16} - EC ₂₁ | 260 | 1900 | 46 | 28000 | 3800 | 7600 |
| EC>21 - EC35 | 1100 | 1900 | 370 | 28000 | 3800 | 7800 |
| EC>35 - EC44 | 1100 | 1900 | 370 | 28000 | 3800 | 7800 |
| | | | | | | |
| Aliph + Arom EC >44-70 | 1600 | 1900 | 1200 | 28000 | 3800 | 7800 |
| Aromatic | | | | | | |
| Benzene | 0.08 | 0.3 | 0.017 | 28 | 72 | 90 |
| Ethyl benzene | 65 | 170 | 16 | 520 ⁽⁸ [17000] | 520 ⁽⁸ [24000] | 520 ⁽⁸ [17000] |
| Toluene | 120 | 610 | 22 | 860 ⁽⁸ [59000] | 860 ⁽⁸ [56000] | 860 ⁽⁸ <i>[87000]</i> |
| Xvlene ⁽⁹ | 41 | 53 | 28 | 480 ⁽⁸ [69000] | 480 ⁽⁸ [41000] | 480 ⁽⁸ [17000] |
| Phonol | 180 | 310 | 66 | 760 ⁽¹⁴ (31000) | 760 ⁽¹⁴ (10000) | 760 ⁽¹⁴ (7600) |
| Polycyclic Aromatic Hydrocarbons (PAH) | 100 | 510 | 00 | 100 (01000) | 100 (10000) | 100 (7000) |
| Naphthalene | 23 | 23 | 41 | 190 | 4900 | 1200 |
| Acenaphthylene | 170 | 2900 | 28 | 83000 | 15000 | 29000 |
| Acenaphthene | 210 | 3000 | 34 | 84000 | 15000 | 29000 |
| Fluorene | 170 | 2800 | 27 | 63000 | 9900 | 20000 |
| Phenanthrene | 95 | 1300 | 15 | 22000 | 3100 | 6200 |
| Anthracene | 2400 | 31000 | 380 | 520000 | 74000 | 150000 |
| Fluoranthene | 280 | 1500 | 52 | 23000 | 3100 | 6300 |
| Pyrene | 620 | 3700 | 110 | 54000 | 7400 | 15000 |
| Benz(a)anthracene | 7.2 | 11 | 2.9 | 170 | 29 | 49 |
| Chrysene | 15 | 30 | 4.1 | 350 | 57 | 93 |
| Benzo(b)fluoranthene | 2.6 | 3.9 | 0.99 | 44 | 7.1 | 13 |
| Benzo(k)fluoranthene | 77 | 110 | 37 | 1200 | 190 | 370 |
| Benzo(a)pyrene | 2.2 | 3.2 | 0.97 | 35 | 5.7 | 11 |
| Indeno(123cd)pyrene | 27 | 45 | 9.5 | 500 | 82 | 150 |
| Dibenzo(ah)anthracene | 0.24 | 0.31 | 0.14 | 3.5 | 0.57 | 1.1 |
| Benzo(ghi)perylene | 320 | 360 | 290 | 3900 | 640 | 1400 |
| Chlorinated Aliphatic Hydrocarbons | | | | | | |
| Vinyl chloride | 0.00064 | 0.00077 | 0.00055 | 0.059 | 3.5 | 4.8 |
| Trichloroethene (TCE) | 0.016 | 0.017 | 0.041 | 1.2 | 120 | 70 |
| 1,1,1,2 Tetrachlorethane | 1.2 | 1.5 | 0.79 | 110 | 1400 | 1500 |
| Tetrachlorethene (PCE) | 0.18 | 0.18 | 0.65 | 19 | 1400 | 810 |
| 1,1,1 Trichlorethane | 8.8 | 9 | 48 | 660 | 140000 | 57000 |

Notes

1. All values above are in mg/kg

2. Numbers in bold are SGVs or GAC that are derived based on SGV report input parameters, numbers in italics are S4ULs, numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters and underlined numbers are C4SLs

parameters and <u>underlined numbers are C4SLs</u>3. Soil organic matter (SOM) is assumed to be 1% - DEFAULT VALUE

4. Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE

5. For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model

6. For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly

7. For classrooms consider increasing the dust loading fator in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100 μ g m⁻³

9. Lowest of o-, m- and p-xylene

10. Based on comparison of inhalation exposure with inhalation TDI

11. Based on comparison of oral, dermal, and inhalation exposure with the oral TDI

12. Based on a comparison of oral and dermal soil exposure with oral Index Dose only

13. Averaged over and based on lifetime exposure

14. Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)

15. NA: Not applicable

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Phase 2 Site Investigation



Appendix A7 – Risk Assessment Methodology

The site-specific risk assessment, presented in this report, follows the principle of establishing whether there is a viable linkage between a contaminant source to a potential receptor, via an exposure pathway.

The risk assessment corresponds with the total site area and incorporates both descriptive (qualitative) and, where available, numerical (quantitative) lines of evidence.

Risk assessment is the process of collating known information on a hazard or set of hazards to estimate actual or potential risk to receptors. The receptor may be humans, a water resource, a sensitive local ecosystem or future construction materials. Receptors can be connected to the source by one or several exposure pathways such as direct contact for example. Risks are generally managed by isolating the receptor or intercepting the exposure pathway or by isolating or removing the hazard.

Without the three essential components of a source, pathway and receptor there can be no risk. Therefore, the presence of contaminant source on a site does not necessarily mean there is a risk.

The risk assessment considers the likelihood of an event taking place (accounting for the presence of the source and receptor and the viability of the exposure pathway) in conjunction with the severity of the potential consequence (accounting for the potential severity of the hazard and the sensitivity of the receptor).

In the risk assessment, the consequence of the hazard has been classified as severe or medium or mild or minor and the probability (likelihood) of the circumstances occurring classified as high likelihood or likely or low likelihood or unlikely.

The consequences and probabilities are subsequently cross-correlated to give a qualitative estimation of the risk using Department of the Environment risk classifications as detailed in the table below and as referenced in CIRIA C552.

| | | Consequence | | | | |
|----------------------|-----------------|-------------------|-------------------|-------------------|-------------------|--|
| | | Severe | Medium | Mild | Minor | |
|) | High Likelihood | Very High Risk | High Risk | Moderate Risk | Moderate/Low Risk | |
| ability
hood | Likely | High Risk | Moderate Risk | Moderate/Low Risk | Low Risk | |
| Prob <i>a</i> -ikeli | Low Likelihood | Moderate Risk | Moderate/Low Risk | Low Risk | Very Low Risk | |
| <u>н</u> П | Unlikely | Moderate/Low Risk | Low Risk | Very Low Risk | Very Low Risk | |

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In accordance with DoE guidance, the following categorisation of **consequence** has been developed.

| Classification | Definition | Examples |
|----------------|--|--|
| Severe | Short-term (acute) risk to human health
likely to result in "significant harm" as
defined by the Environment Protection
Act 1990, Part IIA. Short-term risk of
pollution of sensitive water resource.
Catastrophic damage to
buildings/property. A short-term risk to
an ecosystem or organisation forming
part of such ecosystem. | High concentrations of cyanide on the surface of an
informal recreation area.
Major spillage of contaminants from site into controlled
water.
Explosion, causing building collapse (can also equate to
a short-term human health risk if buildings are occupied). |
| Medium | Chronic damage to Human Health.
Pollution of sensitive water resources. A
significant change in an ecosystem or
organism forming part of such
ecosystem. | Concentration of a contaminant from site exceeds the
generic or site-specific assessment criteria.
Leaching of contaminants from a site to a Principal or
Secondary A aquifer.
Death of a species within a designated nature reserve.
Lesser toxic and asphyxiate effects |
| Mild | Pollution of non-sensitive water
resources. Significant damage to crops,
buildings, structures and services.
Damage to sensitive
buildings/structures/services or the
environment. | Pollution of non-classified groundwater (Inc. Secondary B
aquifers).
Damage to building rendering it unsafe to occupy (e.g.
foundation damage resulting in instability). |
| Minor | Harm, although not necessarily
significant harm, which may result in a
financial loss or expenditure to resolve.
Non-permanent health effects to human
health (easily prevented by means such
as personal protective clothing, etc).
Easily repairable effects of damage to
buildings, structures and services. | The presence of contaminants at such concentrations
that protective equipment is required during site works.
The loss of plants in a landscaping scheme.
Discoloration of concrete. |

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In accordance with DoE guidance, the following categorisation of **probability** has been developed.

| Classification | Definition |
|-----------------|---|
| High Likelihood | There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution. |
| Likely | There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term. |
| Low Likelihood | There is a pollution linkage and circumstances are possible under which an event could occur.
However, it is by no means certain that even over a longer period such event would take place,
and is less likely in the shorter term. |
| Unlikely | There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term. |

In accordance with DoE guidance, the following categorisation of **risk** has been developed.

| Classification | Definition |
|-----------------|---|
| Very High Risk | There is a <i>high probability</i> that <i>severe harm</i> could arise to a designated receptor from an identified hazard at the site without appropriate further action. |
| High Risk | <i>Harm</i> is <i>likely to arise</i> to a designated receptor from an identified hazard at the site without appropriate further action. |
| Moderate Risk | It is possible that without appropriate further action harm could arise to a designated receptor.
It is relatively <i>unlikely</i> that any such harm would be <i>severe</i> , and if any harm were to occur it is <i>more likely</i> that such harm would be <i>relatively mild</i> . |
| Low Risk | It is possible that harm could arise to a designated receptor from an identified hazard. It is <i>likely</i> that, at worst, if any harm was realised any effects would be <i>mild</i> . |
| Negligible Risk | The presence of an identified hazard does not give rise to the potential to cause harm to a designated receptor. |

The term 'risk' in this instance refers to the risk that the source, pathway, receptor linkage for a given source of contamination is complete. It does not refer to immediate risk to individuals or features present on the site from potential contaminants and is intended to be used as a tool to assess the necessity of further investigation.

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Curtins

Unexploded Ordnance (UXO) Risk Assessment

Risk mapping for UXO's has placed the site in a high-risk area. High risk areas are those that show a density of bombing hits of 50+ bombs per 1000 acres and contains potential WWII targets. Further action is considered essential to mitigate UXO risk in high risk areas.

The Envirocheck Report historical mapping indicates several ruins within 250m, two ruins on site, a recorded direct hit and several buildings that disappeared during WWII.

The site before the WWII bombing was in an urban area which was likely to have been targeted during WWII. The site has undergone limited of re-development, and extensive demolition increasing the likelihood of encountering potential UXO devices at the time.

Based on the forgoing commentary, the likelihood of encountering UXO on site as part of the ground investigation or development works is high.

If unexploded ordnance is discovered, stop immediately, prevent access to the area, and inform the police. If the site boundary or location changes then the UXO risk should be reassessed.